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WILDLIFE IN NORTH CAROLINA

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WILDLIFE IN NORTH CAROLINA
2008 PHOTO COMPETITION

While waiting to photograph hooded mergansers and buffleheads, the photographer caught this extremely skittish grebe resurfacing and took this shot.
PHOTOGRAPH BY MARK D. ANDERSON

Volume 73 | Number 1

WILDLIFE IN NORTH CAROLINA

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Cover: The winning photograph, taken at Tulls Creek at Moyock, was the result of a previous scouting trip and an early morning trek out before sunrise. **PHOTOGRAPH BY JARED LLOYD.**

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

North Carolina has many beautiful, iconic natural landscapes to photograph. The difficulty comes when a photographer wants to enter one of these photos in the *Wildlife in North Carolina* Photo Competition. It's not enough to take a great photo of a gorgeous wild place, because that's what everyone else has done, too. There must be something especially outstanding about the image to attract the attention of the judges. Sometimes, a bit of technical skill can make a difference.

SAM HINSON

For Sam Hinson of Chadbourn, the challenge was to simultaneously capture a foreboding sky at Lake Waccamaw State Park and preserve the luminous quality of a pond cypress tree. "When pond cypress needles are lit by late afternoon sun, they glow," Hinson said. He used a three-stop neutral density filter to keep the clouds dark, but that negated the glow of the tree. So he corrected the exposure of the tree in PhotoShop to show how it really looked. Hinson's understanding of photography techniques (the same effect could have been achieved in a photo darkroom with conventional enlarging equipment) allowed him to create an image that accurately portrayed the unique scene he saw.

Hinson's photo was selected Best of State Parks from the 2008 competition. *Wildlife in North Carolina* partnered with the N.C. Division of Parks and Recreation to encourage nature photographers to visit state parks and take advantage of the wealth of information park rangers can provide about possible photo subjects. Of the almost 6,400 entries in the competition, about 1,200 of them were taken in state parks. Hinson took his winning photo in what is practically his Columbus County backyard. With 39 state parks across North Carolina, there likely is one within a short drive of your home.

Please visit our Web site, www.ncwildlife.org, to see larger versions of Hinson's pond cypress photo and all of the other winners in this issue. While you are there, familiarize yourself with the photo competition rules. When you are ready to get out and take photos, visit www.ncparks.gov to find a "naturally wonderful" state park. You may also view a gallery of other great photos from the competition that were taken in state parks. The 2009 photo competition opens June 1, so get out there now!

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

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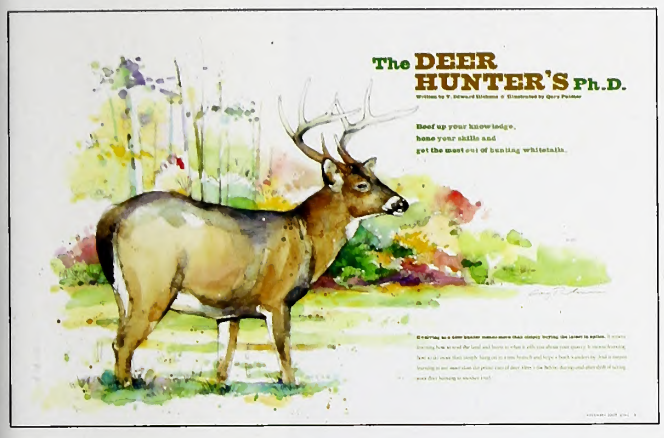


A Degree in Sportsmanship

Although I do not personally hunt deer, I have hunted for about 60 years (since I was 12) and found the article "The Deer Hunter's Ph.D." (Nov. 2008) by T. Edward Nickens so good and informative, I wish it were required reading for all hunters in our state. Specifically, under the heading "Pay Homage," the author captures the essence of the hunt by admonishing us to respect the animals so taken. I experienced this during my army service in Germany, when I was able to participate as a guest on a number of hunts. Das letzte Bissen or "the last bite" is a true symbol of the sportsman's approach to the successful hunt — one we would do well to introduce to our young hunters before they adopt some of the currently observed customs practiced widely in our area today.

Once the deer season began here in eastern North Carolina, deer carcasses and gut piles began littering our roadsides. No one — hunter and nonhunter alike — can observe this practice and associate it with respect for the animal. In my neighborhood just outside of Kinston, I found a fresh doe carcass near my house. Only a portion of the backstrap had been removed, the rest having been left to rot by the trail.

In our area it is common practice to pursue deer with dogs, and thereby, other problems arise. Now the animal is not the only creature disrespected. Often, unwilling landowners are as well because dogs and owners will not stay off their land. When I owned a farm, I tried unsuccessfully to prevent this unwanted intrusion, even to the point of calling the hunt club president. Wildlife officers considered this a trespass problem and referred me to the sheriff's department, which also refused to act, claiming it was a wildlife problem. Selling the farm finally solved my problem.

Deer hunters are by no means the only disrespecters of wildlife. Dove hunters who make no effort to find downed birds during the hunt, or who dump their birds in a ditch after the hunt, could also be cited. I'm sure there are many other examples.

I believe the future of hunting may well depend on our teaching the values of respect and sportsmanship to those who wish to continue the sport. Our Bill of Rights protects our right to keep and bear arms, but nowhere is hunting defined as a right. If we hunters do not present ourselves to the public as promoters of behavior beyond reproach, those we offend will one day vote us out of existence.

Jasper L. Philips Jr., M.D.
Kinston

Respect the Buzz

Looking at the cover of the September 2008 issue, I knew I was in for an informative treat. I could almost smell the sweet aroma of honeybee wax. Some may find it strange that an exterminator would write in defense of honeybees. I do so as a cry for help for these amazing and highly beneficial insects.

No one need fear these little ladies when they find honeybees occupying a dwelling. Homeowners should reject the impulse to exterminate. There are beekeepers and pest control management professionals that can benignly extract and relocate an entire bee colony. (Check with county extension agents and beekeeper associations for information.)

Here's that cry for help: There is no protection by law for our state insect within structures, but there should be. When honeybees occupy a structure, only benign extraction for relocation — no extermination — should be permitted unless a confirmed hazard exists. Where extraction is not practical, and assuming no hazard, a requirement should allow honeybees to remain within the structure through at least one potential swarm cycle, or about one year.

Many homeowners do let bees be bees and enjoy the wonder of their new neighbors. That's a good thing. Let's protect not just our state insect, but an incredibly valuable resource for all of North Carolina. Don't exterminate — relocate!

David Brown
Brown Pest Control
Winston-Salem

Savage Omission

I read the article on low-priced bolt-action rifles ("Staying in the Black," Nov. 2008) and was surprised that Savage Arms did not make the list. They have several models priced below $500, including scope and rings. They are well-made rifles and very accurate. A couple of years ago they came out with the AccuTrigger that is great for accuracy at long distance.

Another lower-priced rifle in the same family is the Stevens, made by Savage, but at an even lower cost. Stevens rifles are on the same design as the Savage without the fine tooling of action and stock. However, with a little patience, you can touch up the stock with a small file and hone the action to perfection. I picked up one new for less than $300 including tax. Another great feature: All Savage and Stevens rifles come from the factory with free-floating barrels.

Patrick Bailey
Henderson

Credit Where it's Due

We failed to credit two photos that appeared in the Back Porch section of the September magazine. The photo of the surf fisherman at Cape Hatteras on page 36 was taken by frequent contributor F. Eugene Hester. The picture of the young angler on page 37 was an NCWRC photo.

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

WILDLIFE IN NORTH CAROLINA 2008 PHOTO COMPETITION

In late 2007, Jared Lloyd was on holiday break from Appalachian State University. For him, that meant more time for photography. Lloyd woke before dawn on Christmas Eve and drove from his parents' home in Moyock to nearby Tulls Creek to photograph the sunrise. But Lloyd wasn't wandering aimlessly in the wintry predawn gloom: He knew that the weather conditions might result in fog over the Currituck County creek, and he knew that if he positioned himself in the right spot, he could capture a great image.

"There are a lot of boat docks along the creek," Lloyd said. "I knew that the sun rose through the trees over the creek, and if I positioned myself in front of those pilings, it would simplify the composition."

Several of the photo competition's judges identified these elements among their reasons for selecting this photo as the grand prize winner. "The image has a nice, clean, simple composition without any distracting elements," said professional photographer Kevin Adams. "Its ethereal atmosphere evokes a sense of calm and stability, while at the same time possessing a remarkable 'wow' factor."

"This image likely required some planning and reflects a photographer's vision as well as an extraordinary moment in the outdoors," said Charlie Peek of the N.C. Division of Parks and Recreation." It's just the right vantage point at just the right instant."

"It has a mystical quality to it," said Mike Dunn of the N.C. Museum of Natural Sciences. "The colors, the fog and the contrast with the stark posts in the foreground all appealed to me. I thought it captured the magic of sunrise better than any image I have seen."

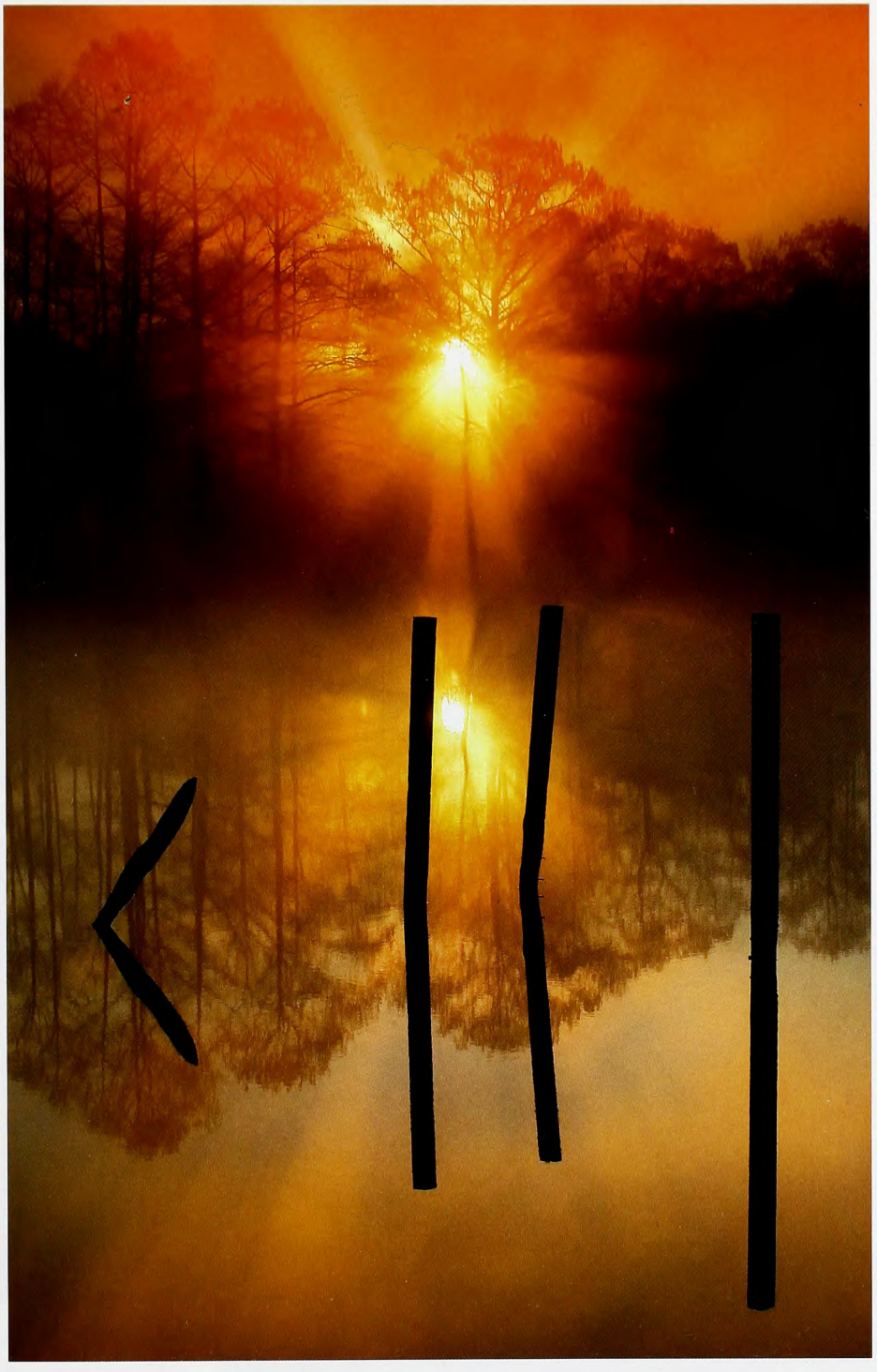
The competition is intended to encourage high-quality nature photography and to identify talented wildlife photographers working in North Carolina. This year's field totaled 6,368 photographs—our largest number of entries ever. In the competition's fourth year, 1,160 photographers took part, including 156 young shutterbugs in the two youth categories.

The most popular subject was Birds (1,069 entries), followed closely by Invertebrates (919) and the landscape category, Peaks, Valleys & Plains (910). Wild Plants received 809 entries and Reptiles & Amphibians 660, Animal Behavior 615, Outdoor Recreation 576, Mammals 481, Youth 13–17 167 and Youth 12 & Under 162.

Our judges included *Wildlife in North Carolina* art director Vickie Cumbee; *WINC* photographer Melissa McGaw; Dunn, coordinator of teacher education for the museum; Adams, author of "North Carolina Then & Now" (Westcliffe Publishers, 2007) and books on waterfalls, hiking and wildflowers; and Peek, public information officer for Parks and Recreation and a former photojournalist.

We thank our corporate sponsor, Great Outdoor Provision Co., for its generous participation in this year's competition. Valuable support was provided by our co-sponsors, the N.C. Museum of Natural Sciences and the N.C. Division of Parks and Recreation. All winning photographs may be seen on exhibit through March at the museum. Various North Carolina state parks will exhibit selected photos from the competition throughout the year. Details and rules for the 2009 competition will be posted on www.ncwildlife.org in May, and entries will open on June 1.

–Greg Jenkins



Jared Lloyd, Kitty Hawk
Sunrise over Tulls Creek, Moyock

Lloyd scouted out the perfect location to capture the sunrise through the trees, then waited for a foggy, still morning to take this image. The beams of sunlight, combined with the mirrorlike water and the interesting pilings, transform a commonly taken photograph into an exceptional image.

BIRDS **FIRST PLACE**

Wesley Gubitz, Wilmington
Brown pelican, Carolina Beach

Bathed in quickly fading sunlight, Gubitz found this pelican behind a local fish house in the Carolina Beach Yacht Basin. He noted that the local boat crews are used to seeing him with his camera as he has been shooting there for the past three years. This shot, taken just as the sun was going down, is one of his favorites.

BIRDS **SECOND PLACE**

Gene Furr, Raleigh
Ring-billed gulls, Carolina Beach

While walking on the beach on New Year's Day morning, 2007, the photographer happened upon this scene while looking for shells in the surf to photograph. Once he noticed these ring-billed gulls flying above his head, he snapped this shot. It turned out to be the only image he got that morning, but it was a good one.

BIRDS **THIRD PLACE**

John Stroud, Raleigh
Red-winged blackbirds, Pocosin Lakes National Wildlife Refuge

Taken in January of 2008, this photo was the result of a morning spent in fields near Pungo Lake. Although Stroud initially set out to photograph snow geese, once they left he noticed great swarms of blackbirds in an adjacent field. It was not until he got closer and the sun caught just the right angle that he realized they had red on their wings.

BIRDS **HONORABLE MENTION**

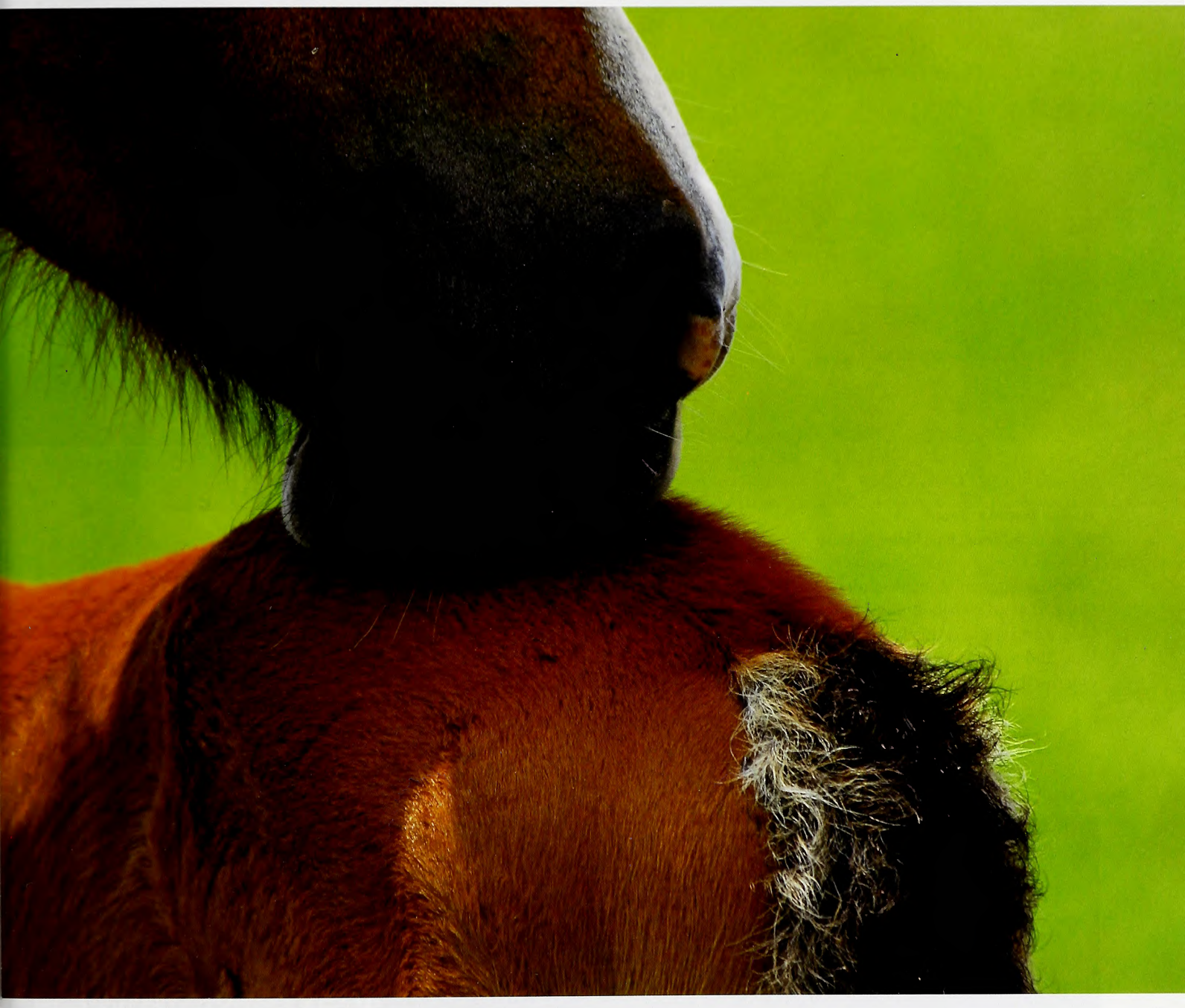
Mark Rustin, Bristow, Va.
Great blue heron, Currituck Heritage Park

Rustin and his wife decided to head out to Currituck Heritage Park to snap some shots of birds in the sound. Upon arriving, they saw this great blue heron landing in the water, and Rustin snapped this shot.

BIRDS **HONORABLE MENTION**

Alexandra Houston, Beaufort
Royal terns, Sandbag Island in Carteret County

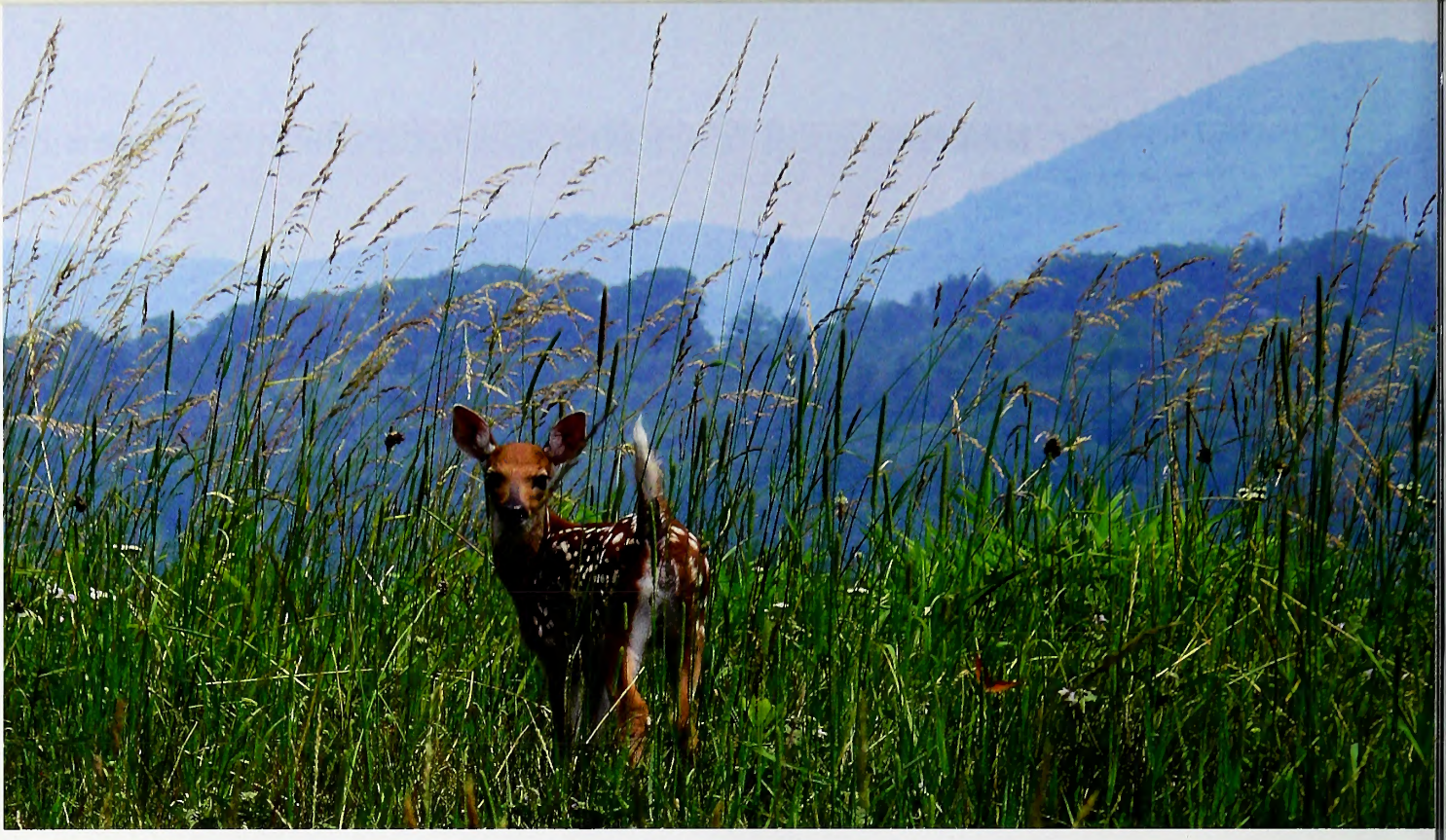
This image was one in a series of photographs that Houston took while attempting to herd terns into a pen to band them. While some photos captured the chaos of the moment with all the heads pointing in different directions, this one marked a moment when all of the chicks began to move together toward the pen. She noted that she really liked the sense of unity and direction in the photo.



MAMMALS **FIRST PLACE**

Wesley Gubitz, Wilmington
Wild horses, Shackleford Banks

Gubitz describes Shackleford Banks, which is part of Cape Lookout National Seashore, as an "amazing place to visit" because the island provides a unique look into the lives of its wild horses. Although some "Banker ponies" are acclimated to people, those with foals can be skittish. He noted that capturing the mare resting her nose on her foal as it passed in front of her was especially fortunate, and fulfilling.



MAMMALS **SECOND PLACE**

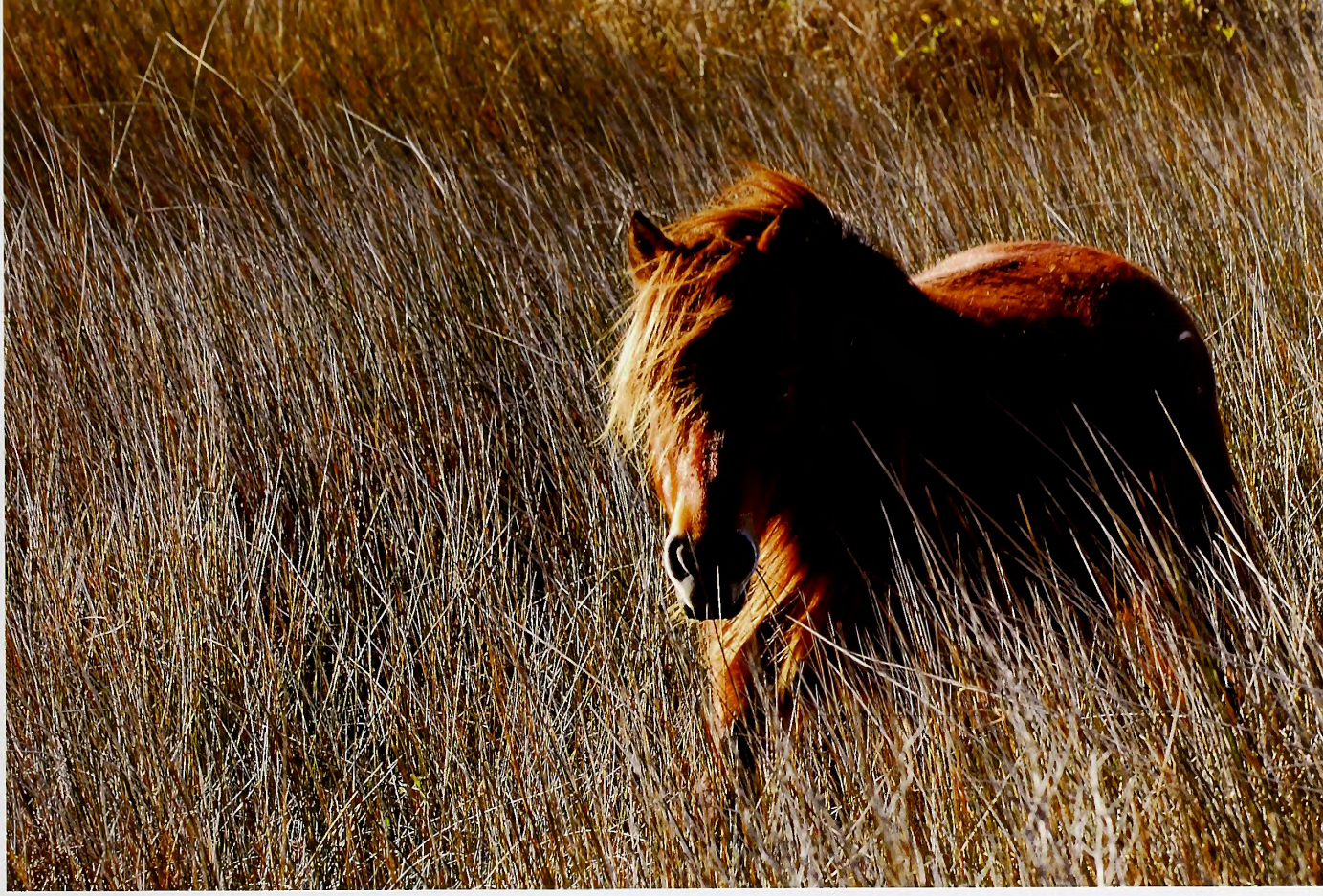
Jessica Maceda, Boone
White-tailed fawn, Blue Ridge Parkway

After having seen many deer along the Blue Ridge Parkway, Maceda stopped at an overlook loop that she had hiked through the night before and spotted this fawn. After a bit of quiet stalking and some hide-and-seek, Maceda was able to flush the fawn and snap this shot of it out in the open. She described it as the highlight of her weekend.

MAMMALS **HONORABLE MENTION**

Culley Wilson, Hampstead
Black bear, Pocosin Lakes National Wildlife Refuge

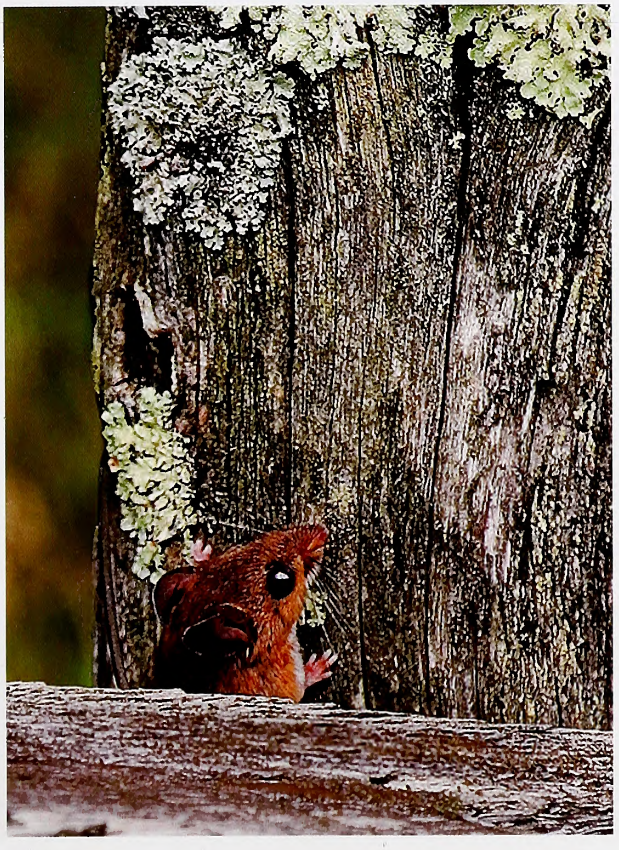
Taken in June 2008 during the massive fire at the refuge, Wilson crawled on his belly for more than 300 yards to get this shot of a black bear feeding in a wheat field with the burned refuge in the background. Coming within 45 yards of the bear, Wilson sat for nearly an hour before snapping this shot.



MAMMALS **THIRD PLACE**

Wesley Gubitz, Wilmington
Wild horse, Shackleford Banks

On his many day and overnight trips to Shackleford Banks, Gubitz gets to observe these wild horses in their natural habitat. Noting that patience is key to getting natural shots, he spends a lot of time just observing them. This shot was of one of the stallions on the island.



MAMMALS **HONORABLE MENTION**

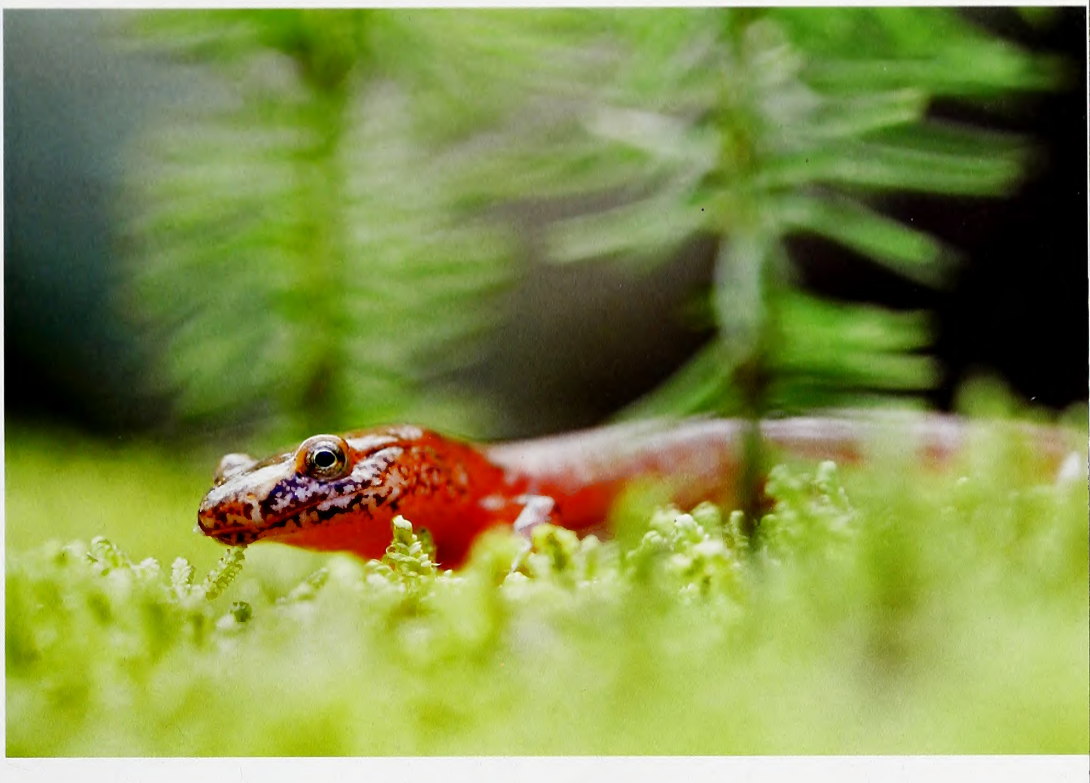
Phillip Stith, Winston-Salem
Mouse, Blue Ridge Parkway

While in the process of setting up his tripod to shoot some wildflowers against a fence in the summer of 2007, some movement caught Stith's eye. A mouse scampering up the fence-post paused just long enough in Stith's view-finder for him to take this picture. Stith said that the mouse gave him a split second to capture the image before it moved on.

REPTILES & AMPHIBIANS **FIRST PLACE**

Parks Roberts Jr., Wilmington
American alligator, Winnabow

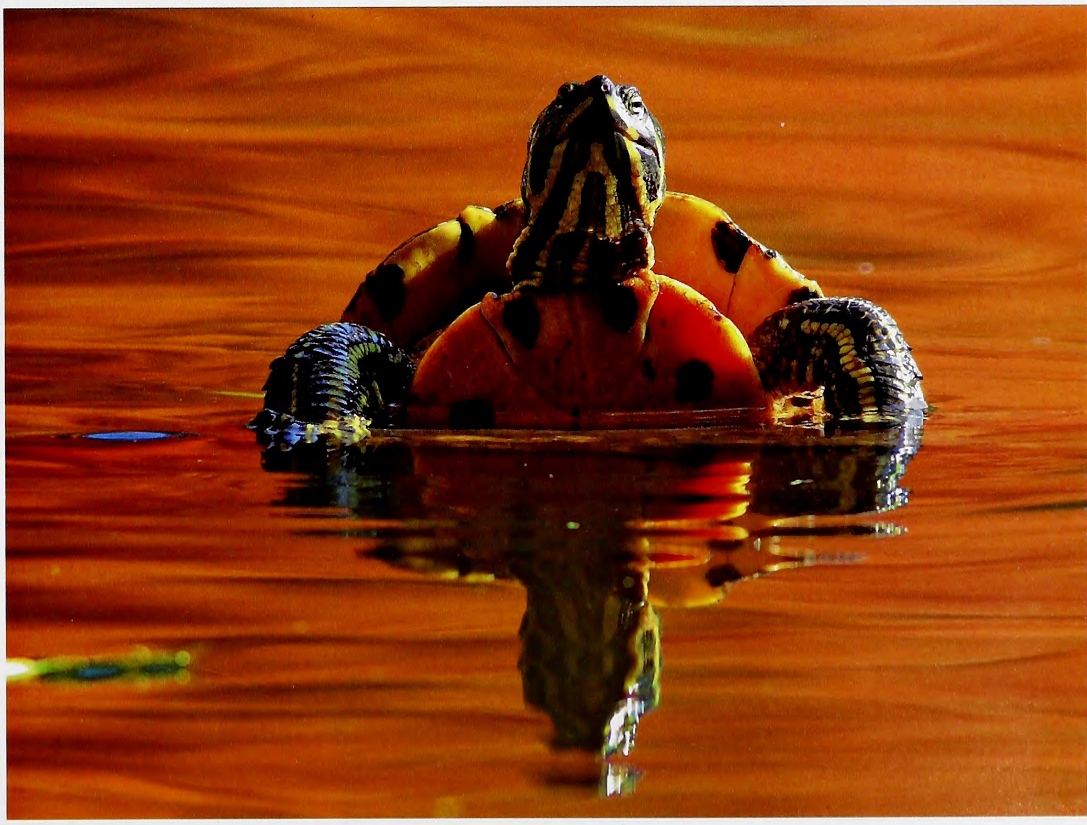
Shot on June 1, 2008, near the Cape Fear River between Wilmington and Southport at Orton Plantation's pond, Roberts spotted this alligator down an embankment about 6 feet below him. As he zoomed in and watched those cold, dark eyes that never moved or blinked, he admitted that he felt a bit unnerved. "Was he thinking I might make a good afternoon snack?" Roberts wondered.



REPTILES & AMPHIBIANS
SECOND PLACE

Scott Hotaling, Cullowhee
Spring salamander, Great Smoky Mountains National Park

While hiking along the Big Creek area of the Great Smoky Mountains National Park in May 2008, Hotaling spotted this small salamander and decided to snap a shot. He felt the combination of the salamander's surroundings and the low angle of the shot made it look like a dinosaur in a forest.



REPTILES & AMPHIBIANS
THIRD PLACE

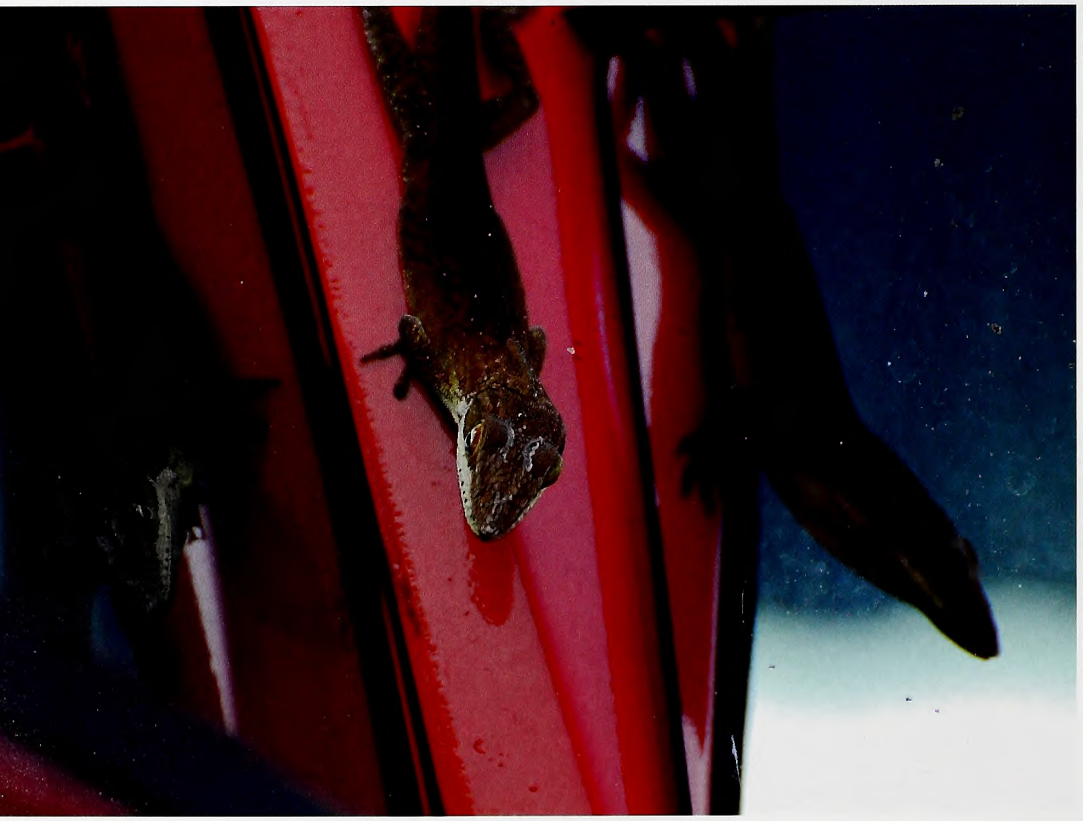
Ed Ziegler, Raleigh
Yellow-bellied slider, Durham

In the fall of 2007, Ziegler spent two days roaming about the Duke Gardens pond looking for wildlife to shoot. On the second day, he ducked into a wooded area to watch for activity in the pond that was beautifully reflecting the colors of the turning leaves of the trees along it. After setting up his camera near ground level, this shot of a turtle emerging from the water was his reward.

REPTILES & AMPHIBIANS
HONORABLE MENTION

Alexandra Houston, Beaufort
Green sea turtle, Pamlico Sound

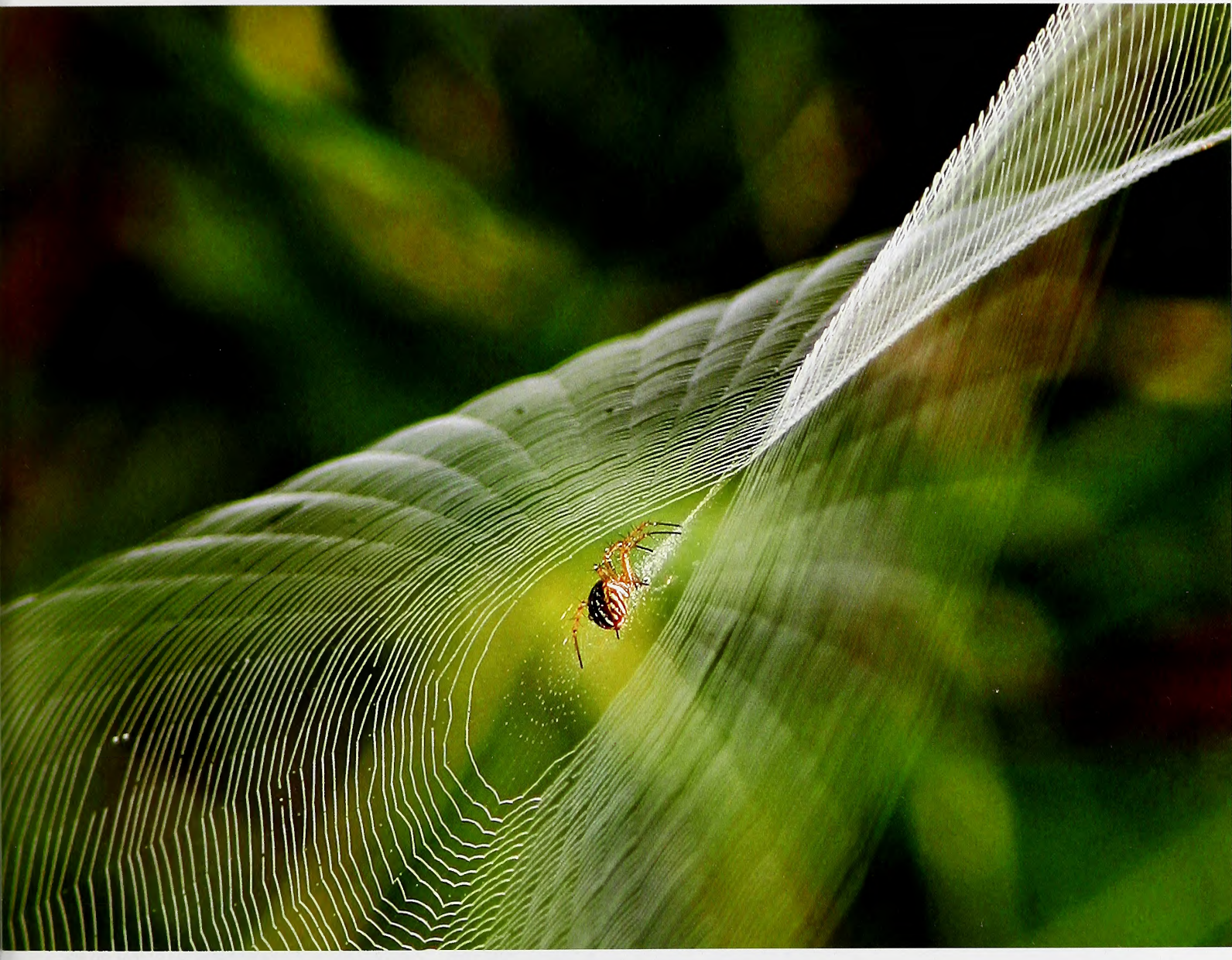
While tagging sea turtles in November 2007 in Pamlico Sound near Cedar Island, Houston snapped this picture right after one turtle was released back into the water. Due to the cold weather it was unable to swim away immediately, giving Houston the chance to snap this shot. The turtle was recaptured and placed on the bottom of the boat to warm in the sun for a moment. Once re-released, it sped off under the surface.



REPTILES & AMPHIBIANS
HONORABLE MENTION

Robin Wynn, Hubert
Carolina anole, Hubert

With her yard inundated with them, Wynn kept noticing an anole that seemed to think that her husband's old truck was a great place for sunbathing. She noted that it would position itself on the edge of the window where it would be reflected in both the mirror and window. Deciding to capture the scene, she took out her camera and caught the anole appearing to admire his reflection.



INVERTEBRATES **FIRST PLACE**

Leanne Greene, Morganton
Orb weaver spider, Morganton

This picture of an orb weaver spider was the result of rising gas prices. Due to her desire to still explore nature with her camera without having to drive anywhere, Greene decided to look around a neighbor's hayfield. It was there that she discovered the beauty of spiders in their webs.

INVERTEBRATES **SECOND PLACE**

Ed Erkes, Goldsboro
Wolf spider, Wayne County

Located in a wet mossy area next to a pond where Erkes has been planting trees, shrubs and other plants to attract wildlife, this photograph required him to lie down on the ground to get just the right angle of the wolf spider. The low angle also allowed him to throw the more distant background out of focus while using a bit of flash to fill in the shadows.

INVERTEBRATES **HONORABLE MENTION**

L. Scott Campbell, Hillsborough
Katydid, Hillsborough

Sometimes a stunning picture is waiting right there in your own yard. In July 2006, Campbell discovered that when he spotted this katydid sitting on a banana plant leaf on the deck at his house. Campbell mentioned that the shot was tricky because the closeness of his macro lens caused the katydid to continually move.

INVERTEBRATES **HONORABLE MENTION**

JoAn Stout, Greensboro
Black widow, Greensboro

Despite the perception of danger, Stout remembered the words of one of her college professors about respecting all wildlife when she discovered this black widow around her tomato stakes. After gingerly carrying the stake that the spider was on into the woods, she shot this picture before it disappeared.

INVERTEBRATES **THIRD PLACE**

Jamie Konarski Davidson, Greenville
Ghost crab, Nags Head

While on the shore at the Outer Banks Fishing Pier in Nags Head around sunrise, Davidson noticed hundreds of ghost crabs digging out their holes. After locating a good spot, she lay flat on the sand and began snapping shots. After a bit of time, she was able to crawl very close to the crab in the photograph, capturing this image.

WILD PLANTS **FIRST PLACE**

Charles Allen, Crofton, Md.
Sea oats, Pea Island National Wildlife Refuge

This shot represented a time of connection between Allen and his half brother on this beach trip. Allen, an avid photographer, spent much of his time there teaching his sibling about photography, with him patiently following Allen around as the photographer chased the light to get the photos he wanted. This one of sea oats taken at the Pea Island National Wildlife Refuge was one of his favorites.

WILD PLANTS
SECOND PLACE

Hobart Jones, Mount Airy
Lone green tree, Pilot Mountain

Taken on an overcast day at Pilot Mountain, Jones found light conditions varying from light to heavily overcast as he strolled about. Walking to the overlook, he looked down and saw this lone tree beginning to leaf and was struck by its vibrant color in a largely monochromatic scene. He employed a telephoto lens to isolate the tree and give it some definition, as it was simply a green dot to the naked eye.

WILD PLANTS
THIRD PLACE

Jared Lloyd, Kitty Hawk
Black-eyed Susans, Blue Ridge Parkway

Lloyd used a low point of view and a short depth of field to isolate one bloom and create an interesting photograph of a common flower.

WILD PLANTS
HONORABLE MENTION

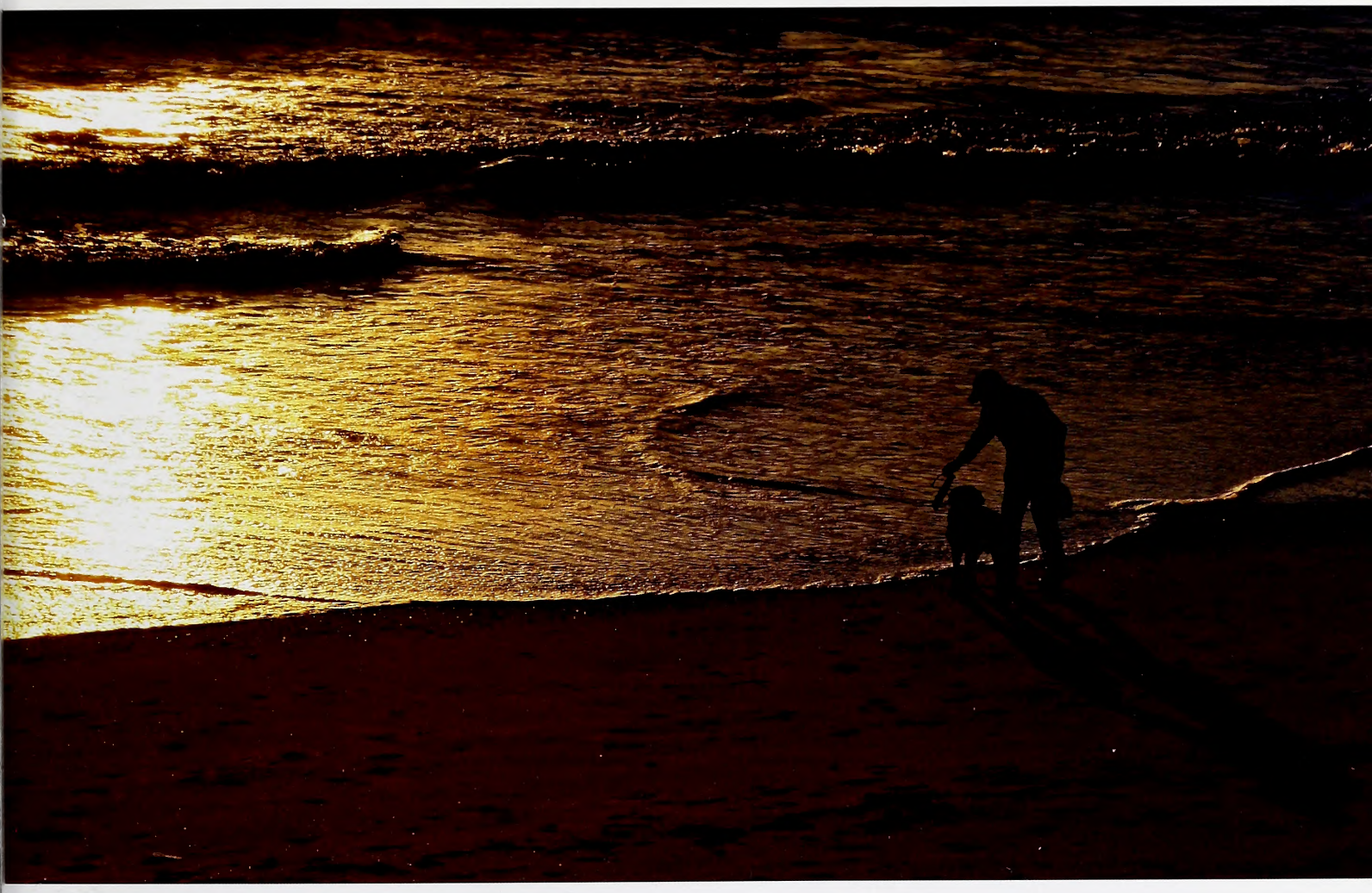
Scott Hotaling, Cullowhee
Icy tree canopy, Great Smoky Mountains National Park

While on a hike through a freshly snow-covered forest in the Great Smoky Mountains National Park near Cherokee in late 2008, Hotaling looked up at the canopy and realized how spectacular that perspective was. After searching for a few minutes, he found this composition for a photograph.

WILD PLANTS
HONORABLE MENTION

Sabrina Kumar, Dillsboro
Spiderwort, Asheville

Taken in May 2007 at The Botanical Gardens at Asheville, this picture brought back childhood memories for Kumar. "My mom introduced me to this plant when I was a kid with the folk name 'true blue,' saying it was the truest blue found in nature," she mentioned. This one, growing wild at the garden, reminded her of the ones she had seen as a child near Lake Summit.



OUTDOOR RECREATION **FIRST PLACE**

Regina Chayer, Garner
Man and dog on beach, Duck

While at the Outer Banks last fall photographing a friend's wedding, Chayer decided to go out on the beach at sunrise while she had a little free time. Struck by the beauty of the sunrise, she noticed this gentleman and his dog. Recognizing that their long shadows made for a good shot, she snapped this picture.

OUTDOOR RECREATION
SECOND PLACE

Jay Wickens, Powells Point
Duck hunter, Corolla

While out taking sunset photos at the sound side of the Whalehead Club in Corolla in January 2008, Wickens noticed this boat approaching. He raised his camera and took this shot as the man, framed against the dimming sky, carefully exited his boat.

OUTDOOR RECREATION
THIRD PLACE

Brenda R. Combs, Wilkesboro
Fisherman on Price Lake, Blue Ridge Parkway

Taken on her husband's birthday in September 2007, this shot was the result of their habit of driving along the Blue Ridge Parkway and taking pictures. Headed to Grandfather Mountain, Combs and her spouse decided to stop and take a picture of the sun rising over Price Lake. Spotting the fisherman, she saw that he provided a great silhouette against the water.

OUTDOOR RECREATION
HONORABLE MENTION

Jared Lloyd, Kitty Hawk
Kayaker on Price Lake, Blue Ridge Parkway

Lloyd was photographing wildlife early in the morning at this lake near Blowing Rock when a kayaker emerged from the fog and paddled across the glassy surface of the water.

PEAKS, VALLEYS & PLAINS **FIRST PLACE**

Scott Hotaling, Cullowhee
Winter sunrise, Appalachian Trail

Hotaling is the first to admit that very few landscapes are as photogenic as a snow-covered mountain scene at sunrise. Traveling out early to capture just the right moment, he was rewarded with this shot. Having been to this spot before, he said that although the play of light from this location at sunrise in the winter is always fantastic, that particular morning was even better than usual.

PEAKS, VALLEYS & PLAINS
SECOND PLACE

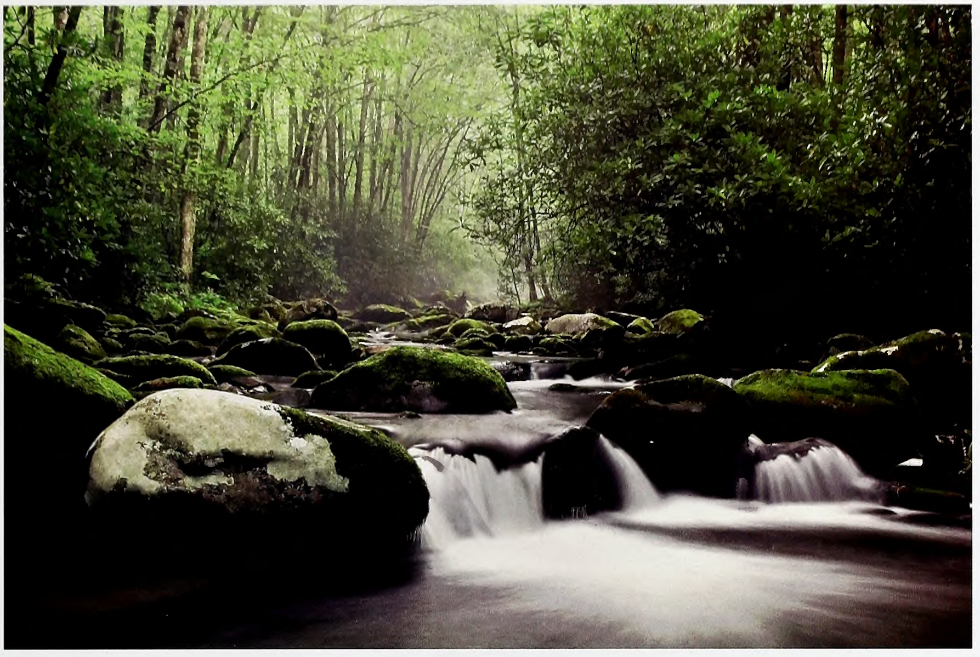
Leslie Sparks, Durham
Beach landscape, Pea Island National Wildlife Refuge

While on a trip to the beach with his wife in January 2008 to see the migrating birds and check out kayaking sites, Sparks stopped at an abandoned Coast Guard facility. While there, he noticed the marching dunes, waves and beautiful cloudy sky. While snapping some shots, he saw a scene with good composition and took this photo.

PEAKS, VALLEYS & PLAINS
HONORABLE MENTION

Cory Barlow, Asheville
Icy panorama, Stone Mountain State Park

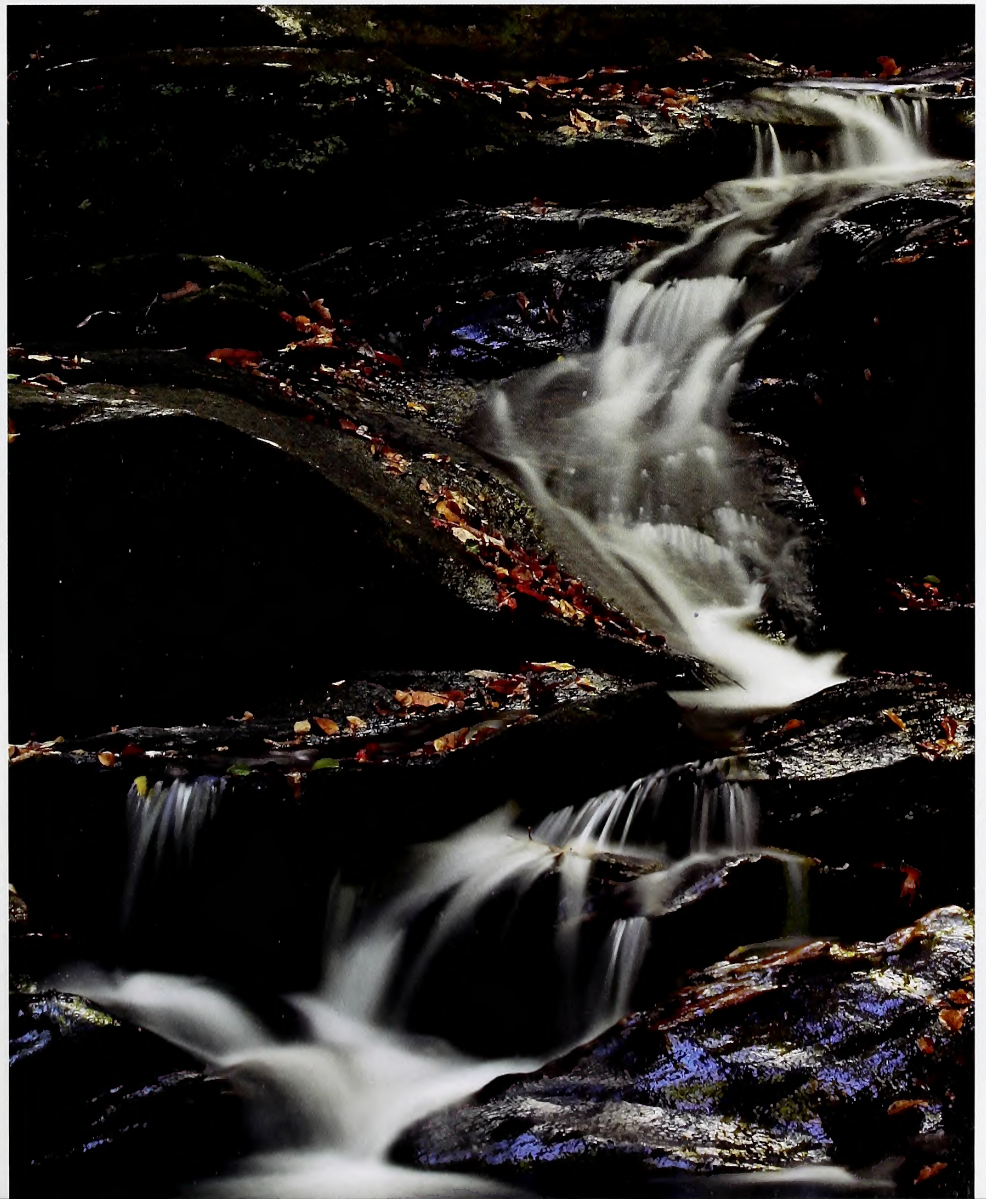
While on a pre-Christmas hike with his father in Stone Mountain State Park, Barlow used a camera set to capture infrared light in grayscale to shoot this scene. "It was spectacular day for infrared photography," he stated. He has hiked and explored the area for most of his life, as he grew up just a few miles away.



PEAKS, VALLEYS & PLAINS
HONORABLE MENTION

Scott Hotaling, Cullowhee
Oconaluftee River, Great Smoky Mountains National Park

Familiar with the area, Hotaling knew that this particular section of the Oconaluftee River looks fantastic after a storm. Consequently, when a summer thunderhead rolled through, he quickly made his way out to the river. He notes that he had to wade out into waist-deep water to get this shot because that perspective was absolutely necessary to the composition.



PEAKS, VALLEYS & PLAINS
THIRD PLACE

Ellen Devenny, Kings Mountain
Waterfall, Busick

Devenny said that this is one of her favorite places to visit and photograph. Taken in October 2007, this photograph of the Roaring Fork waterfall is of what she views as one of the state's greatest hidden treasures. "We stop by when we are in the area, and we seldom see more than a dozen people there. It is a very beautiful and natural area that few people know about," she said.

ANIMAL BEHAVIOR **FIRST PLACE**

Ed Ziegler, Raleigh
Sanderlings, Emerald Isle

While on vacation at Emerald Isle the week of Labor Day in 2008, Ziegler had spent much of his time watching the efforts of sandpipers to defend their territory. On a late afternoon of one of those days, he observed a conflict between two of them, snapping a shot just after one plucked a crab from what was apparently the other's property.

ANIMAL BEHAVIOR
SECOND PLACE

Ed Ziegler, Raleigh
House wrens, Raleigh

Although this bright blue bird house in Ziegler's back yard had been intended for bluebirds, the actual inhabitants turned out to be a family of house wrens. In fact, the house had been the site of a turf battle between the house wren and a bluebird, with the house wren being at first evicted but later claiming the home for itself. In June of 2008, Ziegler spent an entire morning shooting the interactions between the parent house wrens and their brood, with this shot being his favorite.

ANIMAL BEHAVIOR
THIRD PLACE

T. J. Hilliard, Fuquay-Varina
Northern black racer eating a ringneck snake, Fuquay-Varina

An avid photographer of snakes, Hilliard has shot hundreds of pictures of them. In the course of all the shots, he has photographed only two acts of predation, including this one showing a black racer eating a ringneck snake, tail first. Hilliard pointed out that as a snake lover it was difficult for him to watch the ringneck lose its life, but fascinating to see the black racer earn its meal.

YOUTH PHOTOGRAPHER 13–17
FIRST PLACE

James Jernigan, Snow Hill
Brown thrasher eggs, Snow Hill

While riding around his farm in May 2008, Jernigan spotted a bird's nest at the wood's edge. After gently easing up to it, he observed two eggs inside. Venturing closer than he normally would due to the fact that the lens he had on hand was too small, Jernigan snapped five shots and then quietly and quickly left before the mother returned. This photograph was his favorite.

YOUTH PHOTOGRAPHER 13–17
SECOND PLACE

Nathanael Gass, Durham
Snake eating a catfish, Eno River State Park

Often traveling to the Few's Ford access to the park to photograph wildlife, in March 2008 Gass happened upon a Northern water snake eating a catfish. To convey the drama of the scene, he immediately got into the water to get the best angle, while striving to both keep his camera dry and not disturb the snake.

YOUTH PHOTOGRAPHER 13–17
THIRD PLACE

Lee Bottoms, Clemmons
Dogwood petal, Arcadia

Taken in April 2008, this picture is of a dogwood petal that Bottoms found lying on the split trunk of a tree that was knocked down by an old, dying oak. The result of an informal competition that Bottoms has with a close friend of his, this photo was a success for him, winning not only that competition but also placing in this one.

YOUTH PHOTOGRAPHER 13–17
HONORABLE MENTION

lake Orr, Topsail Beach
Sanderling, Topsail Beach

With some patience, Orr was able to get close enough to photograph this sanderling feeding.

YOUTH PHOTOGRAPHER 13–17
HONORABLE MENTION

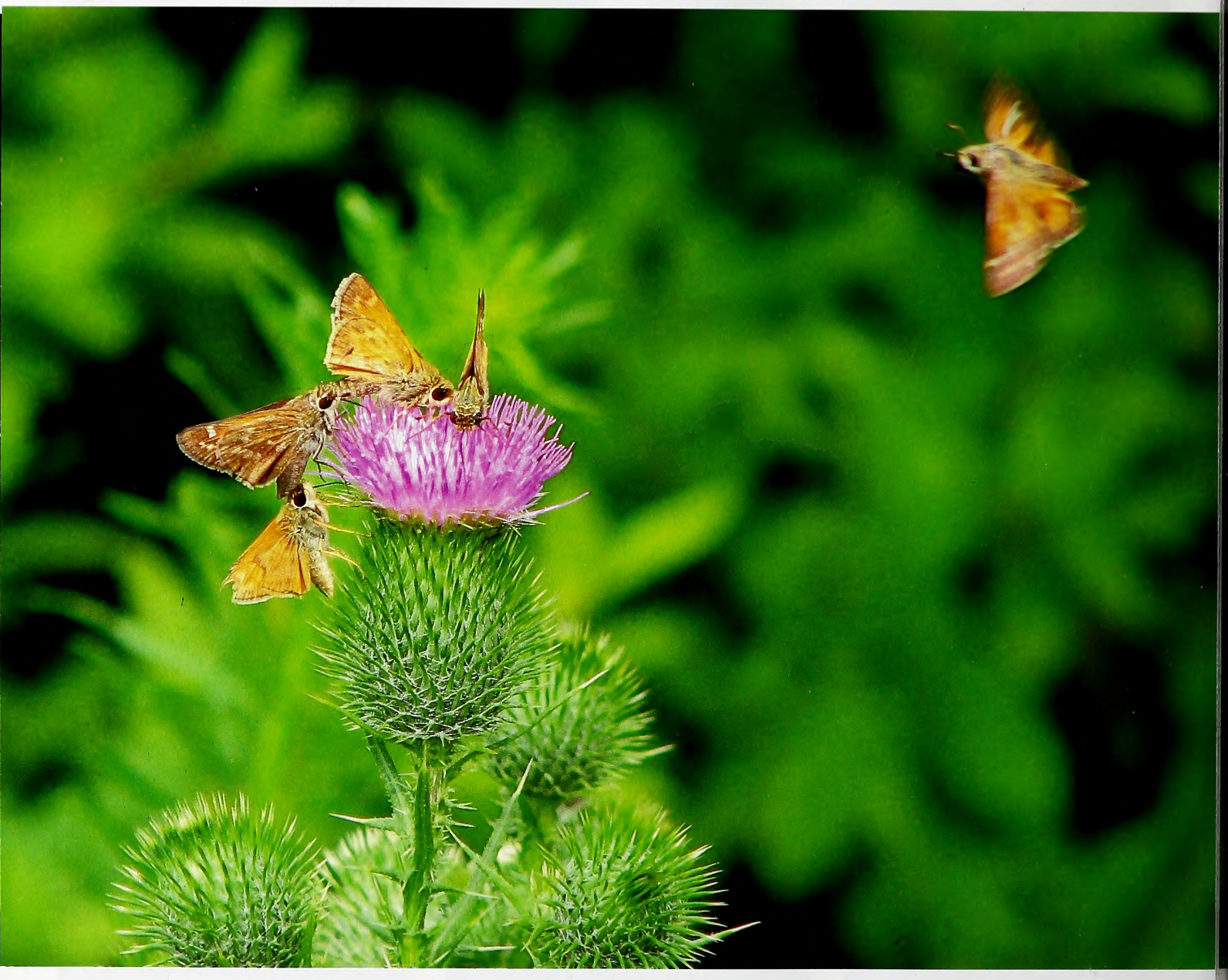
James Jernigan, Snow Hill
Snow geese, Pocosin Lakes National Wildlife Refuge

Once this huge flock started to fly, Jernigan snapped this shot.

YOUTH PHOTOGRAPHER 13–17
HONORABLE MENTION

Nathanael Gass, Durham
Green heron, Elizabeth City

Gass was able to get close enough to this patient and calm heron to photograph it.



YOUTH PHOTOGRAPHER 12 & UNDER
FIRST PLACE

Teresa Koester, Oxford
Sachem skippers on a thistle, Oxford

A good example of the positive side of unintended consequences, the thistle that attracted this group of butterflies grew from seeds that had fallen out of the Koester family's bird feeder. Taken on their front porch, this photograph captured several butterflies feeding on the "weeds" that they are now glad they did not pull.

YOUTH PHOTOGRAPHER 12 & UNDER
SECOND PLACE

Emma Halstead, Walkertown
Ladybug with eggs, Walkertown

While out in her back yard with her mother in June of 2008, Halstead was taking some photos during a pretty summer day. Near their poplar tree while trying to photograph aphids, she spotted some ladybugs and snapped this picture.

YOUTH PHOTOGRAPHER 12 & UNDER
THIRD PLACE

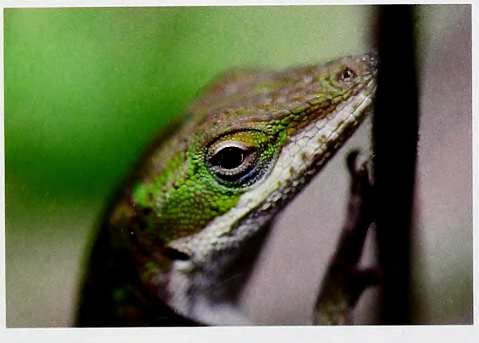
Jesse Motte, Florence, S.C.
Summer azure, Mingo Falls

Nervous about disturbing the insect in his viewfinder and with more flying all around him, Motte zoomed in with his camera and blocked out the background. The result was this impressive shot, taken at the Cherokee Indian Reservation.

YOUTH PHOTOGRAPHER 12 & UNDER
HONORABLE MENTION

Nicole Howren, Cary
Laughing gull, Frisco

When this bird flew up in front of the sunset, Howren captured this picture.



YOUTH PHOTOGRAPHER 12 & UNDER
HONORABLE MENTION

Lucas Bobay, Holly Springs
Anole, Holly Springs

Bobay snapped this shot of an anole that was hunting for insects in his yard.

YOUTH PHOTOGRAPHER 12 & UNDER
HONORABLE MENTION

Currie Chavez, West End
Ebony jewelwing, Weymouth Woods Park

Chavez took this picture in July 2008 when the insect alighted in front of her.

Many human families head south each fall to escape winter's chill. Geese take wing, and thousands upon thousands head for North Carolina's wetlands and waterways. Loud *whouks* and *a-honks* announce their welcome arrival.

HONK if You Love Geese

written by Julie Dunlap / illustrated by Consie Powell / nature activity by Anne M. Runyon

Geese, ducks and swans belong to the same worldwide bird family, Anatidae, called waterfowl in North America. Though different in many ways, waterfowl share traits such as long wings to lift their medium-to-large bodies in flight and webbed feet to power their swimming. What's special about geese?

DUCK? DUCK? GOOSE!

Usually geese are middle-sized compared with their duck and swan relations. The tiny Ross's goose is a little bigger than a mallard duck, and our largest geese, giant Canadas, are usually a little smaller than trumpeter swans. Geese are about halfway between ducks and swans in neck and leg length too. Also, their legs are centered under their bodies, so they can walk easily while eating grass and other land plants. Duck legs are farther back, making them quicker swimmers than geese but awkward on land. You'll never see a goose waddle like a duck.

Seven species of geese breed in North America. In North Carolina, the best time to see lots of waterfowl is winter. Flock after flock arrives each fall on bays and marshes of the Atlantic coast and on lakes inland. Places like Currituck Sound on the Outer Banks have attracted so many geese for so long that "Currituck" comes from a Native American word meaning wild geese.

GREATER WHITE-FRONTED GEESE may overwinter in Canada, Asia or Great Britain, but a few have been spotted in North Carolina.

SOUNDS OF THE SEASON

Huge flocks announce their return each fall with clamorous calls. Good listeners can identify each different species as birds fly overhead. Snow geese make a stuffed-nose-sounding *whouk whouk*, and cackling geese give a high-pitched cackle. A brant's throaty *ronk* makes a flock sound like flying sheep, and Canada geese *a-honk* and *hink* so much that some people just call them "honkers."

Why do they make so much noise? Social birds, wild geese travel long distances in big families to and from nesting grounds in the far north. At the end of each summer, shortening days signal the time to start south, and young birds follow their parents, aunts and uncles to learn the way. The families honk as they travel to keep in touch, and honk some more with excitement when they reach their winter homes.

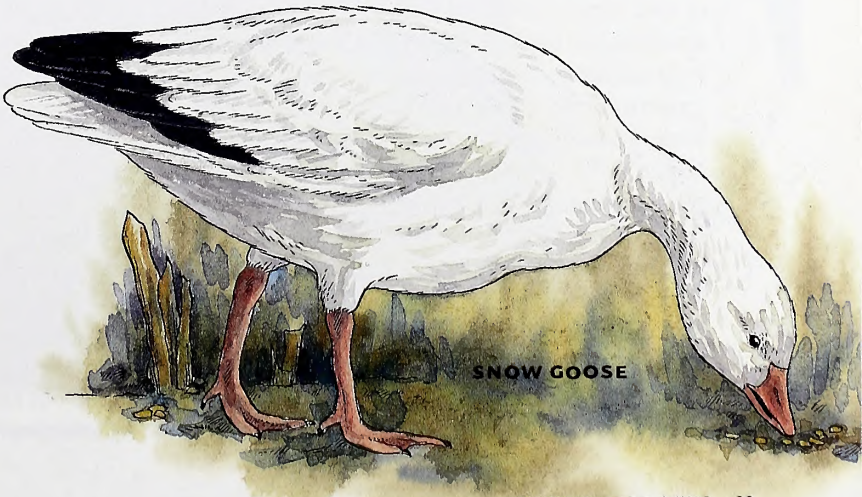
Looking a bit like a dirty snowball in a blizzard, a **BLUE GOOSE** is a dark form of the **SNOW GOOSE**. They're rare along the Atlantic coast but more common in flocks farther west.

A BIRD THE COLOR OF WINTER

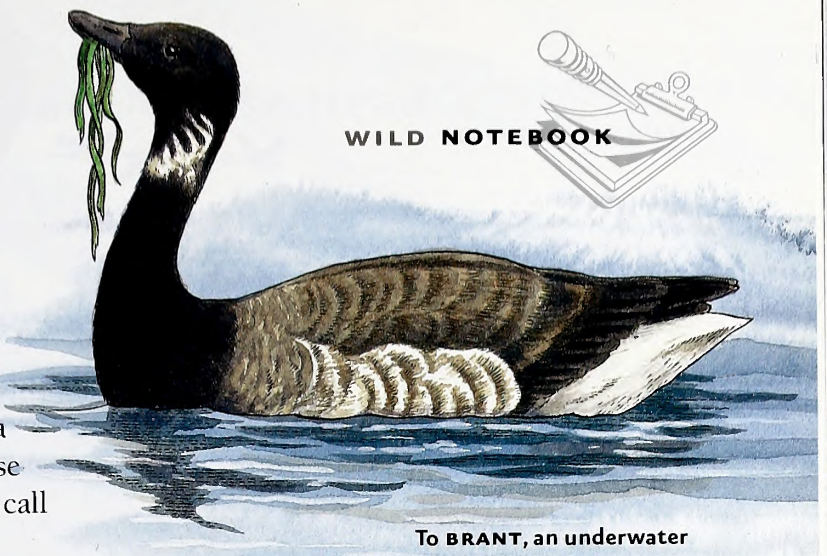
Over one million snow geese migrate north and south along the Atlantic Coast each year, and six million more journey up and down the continent farther west. What do 10,000 snow geese look like when they swirl out of a gray January sky into a Carolina salt marsh? A blizzard!

Wherever they are, snow geese are hungry. Their pink bills have notched edges that help the birds tear into the tough plants they love to eat. While raising young goslings on the tundra each summer, snow geese dine on grasses and sedges. In winter, they may take off each morning to gobble waste corn in farm fields or stay in the marsh munching cordgrass rootstock. Their eating style of digging plants up by the roots is called "grubbing" and can quickly damage a wetland if too many geese grub too many plants.

ROSS'S GOOSE looks like a **SNOW GOOSE**, but is best distinguished by its smaller size and tiny bill. **CACKLING GEESE** are a similar-looking but separate species only occasionally seen in North Carolina. They are much smaller with a very short bill.



SNOW GOOSE



To **BRANT**, an underwater plant called eelgrass is as tasty as spaghetti.

WILD GOOSE CHASE

Everyone seems to recognize Canada geese, with their long black necks and white chinstraps. Even overhead, their musical voices and V-shaped flying patterns make them easy to identify.

Each spring, only a fraction of our state's Canada geese fly north to breed in Canada. In fact, many Canada geese in the U.S. are not migratory. Resident geese live in every North Carolina county, raising goslings in neighborhood ponds and parks instead of the northern wilderness. The parents do not teach the young to fly north, and every year, resident populations grow larger.

That means people in North Carolina get to watch pairs of Canada geese nest and raise two to eight downy goslings close to home. But it also means that crowds of geese can quickly overgraze a lawn. The birds seem to defecate almost as much as they eat, and goose droppings soil schoolyards, walkways, beaches and golf courses where the birds spend time. Many people see resident Canada geese as pests, not part of wild nature like migratory Canada geese.

GOOSE BUMPS

Only a few decades ago, wild goose populations were in trouble. Uncontrolled hunting shrank many flocks, and over time, disappearing wetlands left birds with fewer places to live. Improved hunting laws and creation of wildlife refuges gave geese the chance to recover. Populations rebuilt, and many geese species became conservation success stories.

These days, though, snow geese and resident Canada geese flocks may have grown too large, damaging habitat they and other wildlife need to survive. Wildlife managers are working to find ways to control the birds' numbers and protect more habitat so that our winter skies will always be filled with the *honks* of geese.

Get Outside

Meet gaggles of geese: To witness spectacular flocks of wild geese, visit a national wildlife refuge. These areas protect land and water that wildlife need for food and shelter, and tens of thousands of wild geese return to North Carolina refuges each fall. To experience a snow goose blizzard, head for Pocosin Lakes National Wildlife Refuge. But if you want a Canada goose symphony, visit Mattamuskeet NWR. Many refuges have wildlife observation towers, decks or bird blinds where you can quietly observe geese feeding, preening and courting. Notice, too, that waterfowl often travel in mixed flocks. If you're a lucky duck, you may spot a little Ross's goose among a flock of larger snow geese or brant among look-alike Canadas.

Read and Find Out

- "Birding North Carolina" by Marshall Brooks and Mark Johns, Globe Pequot Press, 2005.
- "Skylar" by Mary Cuffe-Perez, Philomel Books, 2008.
- "The Snow Geese: A Story of Home" by William Fiennes, Random House, 2002.
- "The Flight of the Snow Geese" by Deborah King, Orchard Books, 1998.
- "The Sibley Guide to Bird Life and Behavior" by David Sibley, Knopf, 2001.

In *Wildlife in North Carolina:*

- "A Perception of Abundance" by Jim Wilson, October 2005.
- "How Do Migrating Birds Navigate?" by Clyde E. Sorenson, October 2005.
- "Canadas in Crisis" by Vic Venters, November 1996.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make a Honker: A Canada Goose Head

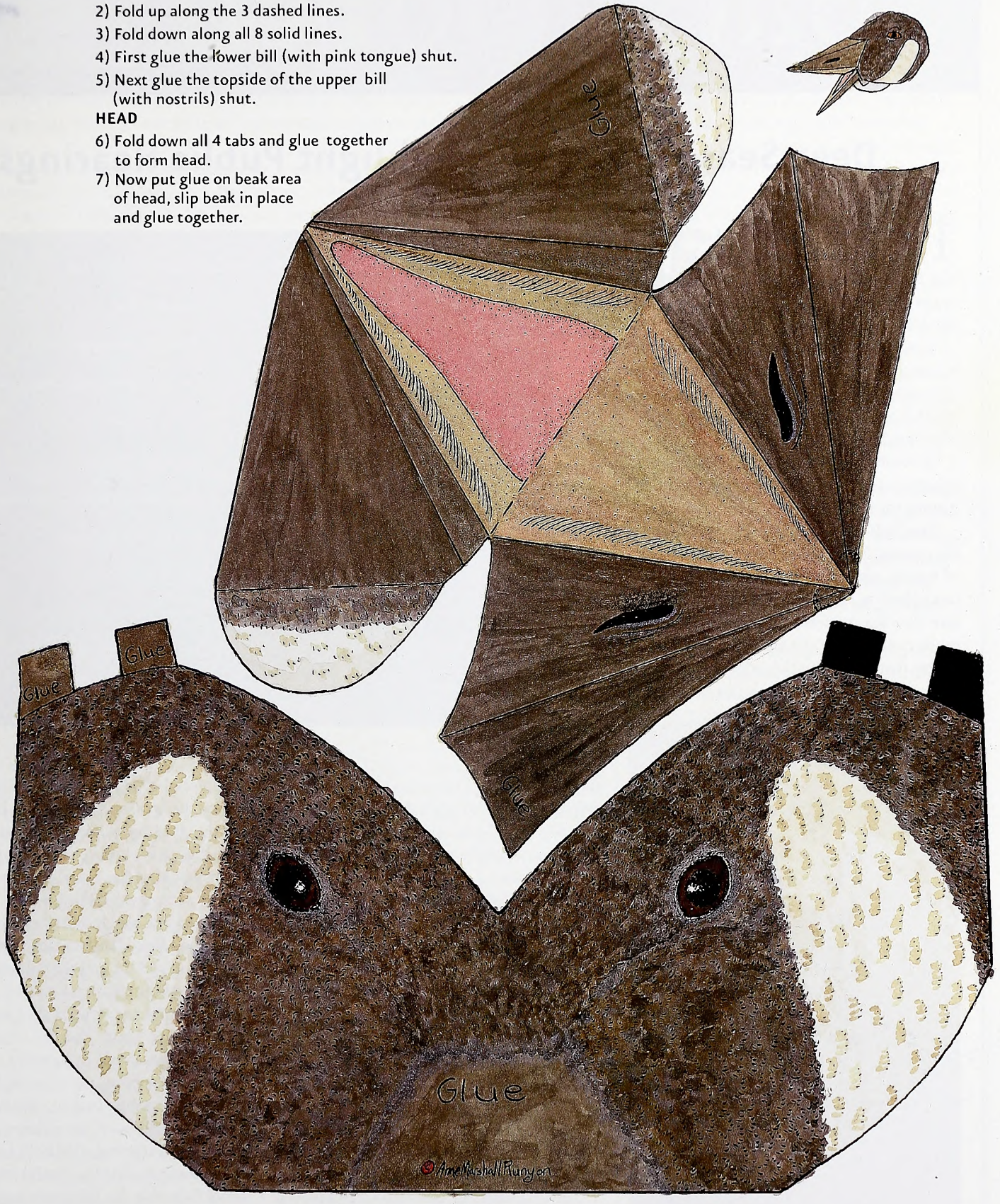
1) Cut out both parts of your honker.

BEAK

2) Fold up along the 3 dashed lines.
3) Fold down along all 8 solid lines.
4) First glue the lower bill (with pink tongue) shut.
5) Next glue the topside of the upper bill (with nostrils) shut.

HEAD

6) Fold down all 4 tabs and glue together to form head.
7) Now put glue on beak area of head, slip beak in place and glue together.



This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Deer Season Changes Highlight Public Hearings

The N.C. Wildlife Resources Commission has scheduled a series of 10 public hearings this month to detail proposed changes in the hunting and fishing regulations for the 2009–2010 seasons.

In addition to the nine public hearings held across the state, the commission has added a 10th hearing in Raleigh to elicit opinions on another set of proposals that are primarily administrative in nature.

A number of the proposals being taken to district public hearings involve deer hunting. Among the proposals are:

Establish a uniform deer season (matching the current Eastern deer season) in and east of Yancey, McDowell and Rutherford counties (districts 1–8) with the following structure: Bow season would begin on the Saturday on or nearest Sept. 10 and end the fourth Friday thereafter. Muzzleloader season would open the Saturday on or nearest Oct. 8 and end the following Friday. An all lawful weapons season would open the Saturday on or nearest Oct. 15 and end Jan. 1. The use of bows also would be allowed during muzzleloader season.

JODY DUGGINS / NCWRC

Under these proposals hunters would be required to attach a physical tag to big game harvests at the site of the harvest. Implementation of this rule would be delayed until the start of the 2010 seasons.

The commission will propose allowing falconry on Sundays, except for migratory birds, and allowing bow hunting on Sundays on both private and game lands, except for migratory birds.

The commission also would allow the use of crossbows, without permit, any time bows and arrows are legal weapons.

The proposals also address changes to wild turkey seasons. The Youth Only Day would be replaced with a Friends and Family Afield Day on the first Saturday of April. Each person hunting that day would have to be accompanied by at least one other person. Shooting hours would end at 1 p.m. The spring wild turkey season would begin the Sunday (assuming Sunday hunting with bows and arrows is adopted) after Friends and Family Afield Day and the end the Saturday of the fourth week thereafter. From Sunday to Friday of that week, legal shooting hours would end at 1 p.m. and the total bag for those six days would be limited to one bird.

Among the proposals to be addressed at the Raleigh public hearing would be the elimination of the winter either-sex turkey season, and starting wild boar season on Sept. 10 and ending the season on the last day of February. No proposals presented at the other nine hearings will be presented.

2009 PUBLIC HEARING SCHEDULE ALL HEARINGS BEGIN AT 7 P.M.

DATE	DISTRICT	CITY	LOCATION
Jan. 5 (Mon.)	4	Dublin	Bladen Community College
Jan. 7 (Wed.)	5	Graham	Graham High School Auditorium
Jan. 8 (Thurs.)	6	Norwood	South Stanly High School
Jan. 13 (Tues.)	8	Morganton	Municipal Auditorium
Jan. 14 (Wed.)	9	Sylva	Southwestern Community College
Jan. 15 (Thurs.)	7	Boonville	Starmount High School
Jan. 20 (Tues.)	1	Edenton	Swain Auditorium
Jan. 21 (Wed.)	2	New Bern	Craven County Courthouse
Jan. 22 (Thurs.)	3	Rocky Mount	Nash Community College
Jan. 28 (Wed.)	3	Raleigh	NCWRC headquarters

Blue Marlin, Tarpon Records Fall

A couple of high-profile state saltwater fishing records were broken in the second half of 2008.

Trey Irvine of Weston, Fla., landed a gigantic blue marlin that weighed 1,228 pounds, 8 ounces and measured 179.5 inches total length (tip of the nose to tip of the tail) with a girth of 82 inches.

Irvine caught the marlin off Oregon Inlet onboard the *Mimi* while participating in the Pirate's Cove Billfish Tournament in Manteo in mid-August.

The fish eclipses the former state blue marlin record of 1,142 pounds caught off Oregon Inlet in 1974 by Jack Herrington. The world record blue marlin stands at 1,402 pounds, 2 ounces and was caught off Brazil in 1992.

Just a month later, Malcolm Condie of Newport broke the state tarpon record with a 193-pound, 5-ounce fish while fishing for king mackerel at the Sea View Pier in North Topsail Beach.

NC DIVISION OF MARINE FISHERIES

The fish measured 80 inches fork length (tip of the nose to the fork in the tail) and had a girth of 42 inches. Condie was fishing a popeye mullet on 30-pound test monofilament with a 60-pound, 7 strand wire leader.

Jesse Lockowitz held the previous state record with a 175-pound tarpon caught at Bogue Inlet Pier Sept. 7, 2005. The world record tarpon is 283 pounds, caught in Africa.

Condie said he initially hoped to donate the fish to the N.C. Aquarium at Pine Knoll Shores. Instead, researchers with the University of Miami Rosenstiel School of Marine and Atmospheric Sciences happened to be in the area, so he allowed them to remove the ear bones and other fish parts for DNA and age tests.

Felt Soles On the Way Out For Fishing

Trout Unlimited has asked fishing equipment manufacturers to stop producing felt-soled waders and wading shoes by 2011 to help bring an end to the spread of aquatic nuisance species by anglers in America's rivers and streams.

Many waders, wading boots and shoes used by anglers have felt-soled bottoms that are used to provide traction while walking in water. Felt is a material that transmits aquatic nuisance species such as New Zealand mud snails, the invasive algae called didymo, or rock snot, and the parasite that causes whirling disease, a disease fatal to trout. Felt soles can easily become impregnated with mud and other organic matter, and become difficult or impossible to clean and disinfect.

New technology and materials provide viable alternatives to felt. Some manufacturers are already using these newer materials on wading shoes and angling products. Simms, for example, has announced that 2009 will be the last year it will offer felt-soled boots. The company will introduce a new sticky rubber sole on eight boot models this month.

The impact of aquatic nuisance species on native species is substantial, second only to loss of habitat, and is responsible for causing losses in biodiversity, changes in ecosystems, and impacts on economic enterprises such as agriculture, fisheries and international trade.

"It's like a war on our streams, rivers and lakes, with a new enemy rearing its ugly head each week. First, whirling disease, then mud snails, then some invasive aquatic plant," said Jack Williams, Trout Unlimited's senior scientist. "We have to be more aggressive in our battle against the spread of invasive species."

Aquatic nuisance species are present in many rivers, streams and lakes around the country. For example, zebra mussels were first found in Lake St. Clair near Detroit, Michigan in 1986 and now infest waters from Vermont to Oklahoma. Each year $30 million is spent in the Great Lakes to monitor and control zebra mussels, which are responsible for massive changes in the Great Lakes ecosystem, including elimination of native mussels and creating toxic algae blooms.

Zebra mussels are also creating significant impacts on Great Lakes fishery resources and fishery restoration efforts, and might be playing a role in the decline of scaup (see "Bad Days for Bluebills," December 2008).

Archery in Schools Program Going Statewide

After a successful pilot phase in North Carolina, the National Archery in the Schools Program is now being expanded statewide.

The program is offered through physical education classes for grades 4–12 in public schools. Students aim at bulls-eye targets in a gym, with special backdrops and safety restraints, in Olympics-style archery.

"Students maintain an interest because archery is exciting and fun," said Travis Casper of the N.C. Wildlife Resources Commission, the National Archery in the Schools coordinator for North Carolina. "Teachers like it because it builds math skills, teaches history and culture, stresses responsibility and encourages social interaction."

The National Archery in the Schools Program is based on a safety curriculum, with adjustable equipment that allows students in wheelchairs to participate alongside others, and puts boys and girls of varying physiques on an equal playing field.

"The archery program, as a part of the regular physical education curriculum here, has had a huge impact," said Dave Edwards, coach and physical fitness instructor at Gates County High School, one of the first schools involved in the program in North Carolina. "It gives a student who may not be a standout on a varsity sports teams the chance to take pride in themselves and in their school."

To learn about getting the National Archery in the Schools Program started for your school, call (919) 707-0337 for additional information.

NCWRC

IN SEASON

This month, these seasons are open in North Carolina:

Black Bear: See *Regulations Digest* for dates and locations.

Bobcat: Through Feb. 28.

Common Snipe: Through Feb. 28.

Crow: Wednesday, Friday and Saturday of each week through Feb. 28.

Fox: See *Regulations Digest* for dates and locations.

Mourning Dove: Through Jan. 10.

Pheasant: Through Feb. 1 (male only).

Quail: Through Feb. 28.

Rabbit: Through Feb. 28.

Raccoon and Opossum: Through Feb. 28.

Ruffed Grouse: Through Feb. 28.

Squirrel: Gray and red through Jan. 31.

White-tailed Deer:

Eastern: gun season through Jan. 1.

Central: gun season through Jan. 1.

Urban: bow and arrow season Jan. 10–Feb. 14.

Wild Boar: Through Jan. 1 in Cherokee, Clay, Graham, Jackson, Macon and Swain counties. (In the other 94 counties, feral hogs are not considered to be wild boars, and the commission does not regulate them.)

Wild Turkey: Jan. 12–17 (private lands only in 10 counties).

Woodcock: Jan. 2–31.

Migratory Waterfowl

Canada Goose: Resident Population Through Feb. 7; Northeast Hunt Zone Through Jan. 24 (permit only).

Snow, Blue and Ross' Geese: Through Feb. 28.

Brant: Through Jan. 24.

Tundra Swan: Through Jan. 31 (permit only).

Ducks, Coots and Mergansers: Through Jan. 24 (canvasback and harlequin duck seasons closed).

Sea Ducks: Through Jan. 31 in Special Sea Duck Area.

Youth waterfowl Day: Jan 31.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria.

Check the *2008–2009 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

CALENDAR OF EVENTS

Sunday, January 4

Learn about wintering waterfowl at Lake Mattamuskeet National Wildlife Refuge with staff from the Outer Banks Center for Wildlife Education. Tour lasts five hours and is limited to those ages 14 and older.

Call (252) 453-0221, extension 3.

Visit www.ncwildlife.org.

Friday–Sunday, January 9–11

Check out the latest rods, reels, lures and other fishing gear at the Bass and Saltwater Expo at the State Fairgrounds in Raleigh. Event also includes boat dealers and seminars with professional fishermen.

Visit www.ncboatshows.com.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Engraved Pavers Help Support Aquatic Programs

A new walkway at the John E. Pechmann Fishing Education Center is paving the way for anglers of all ages, skill levels and abilities to enjoy more fishing opportunities at the Fayetteville-based center.

The N.C. Wildlife Resources Commission is selling engraved pavers to help support aquatic programs conducted at the center, as well as fisheries outreach programs coordinated across the state through the center, including a mobile aquarium, kids' fishing events and a Tackle Loaner Program. The stone pavers will form the Conservationist Walkway, which will wrap around the new facility.

Stone pavers are available in three sizes:

- 3-inch by 6-inch paver, $50, engraved with up to 20 characters including spaces;
- 6-inch by 6-inch paver, $75, engraved with up to 40 characters including spaces; and
- 6-inch by 9-inch paver, $100, engraved with up to 48 characters including spaces.

Paver purchases are tax-deductible.

The commission provides two easy ways to order a paver:

- Online at www.ncwildstore.com (credit card purchases only); or
- Mail in the completed application form, available at www.ncwildlife.org/paver, along with a check or money order to: Wild Store Order Desk, N.C. Wildlife Resources Commission, 1710 Mail Service Center, Raleigh, N.C. 27699-1710.

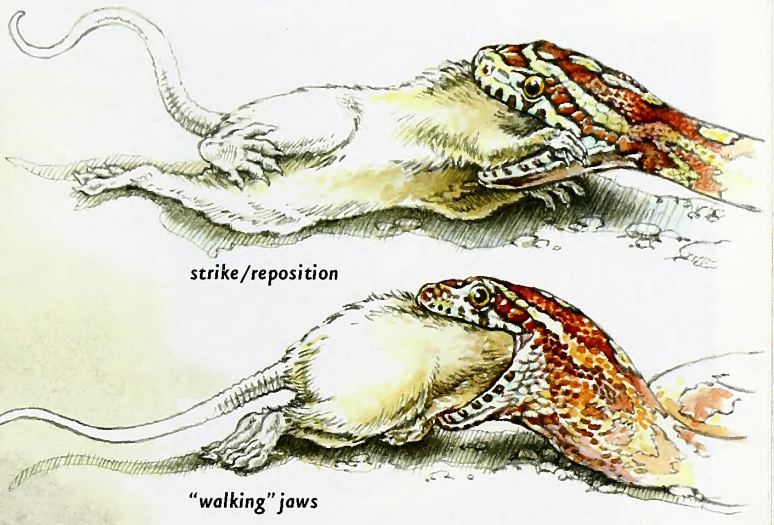
"The Conservationist Walkway is a unique and lasting way to pay tribute to family and loved ones and, at the same time, support aquatic programs conducted at the center," said Kristopher Smith, director of the Pechmann Center. "It was appropriate that the walkway be placed at the Pechmann Center; our mission is teaching kids and adults about the sport of fishing and the conservation of aquatic resources."

For more information on the Conservationist Walkway, contact Smith at (910) 868-2468, ext. 14.

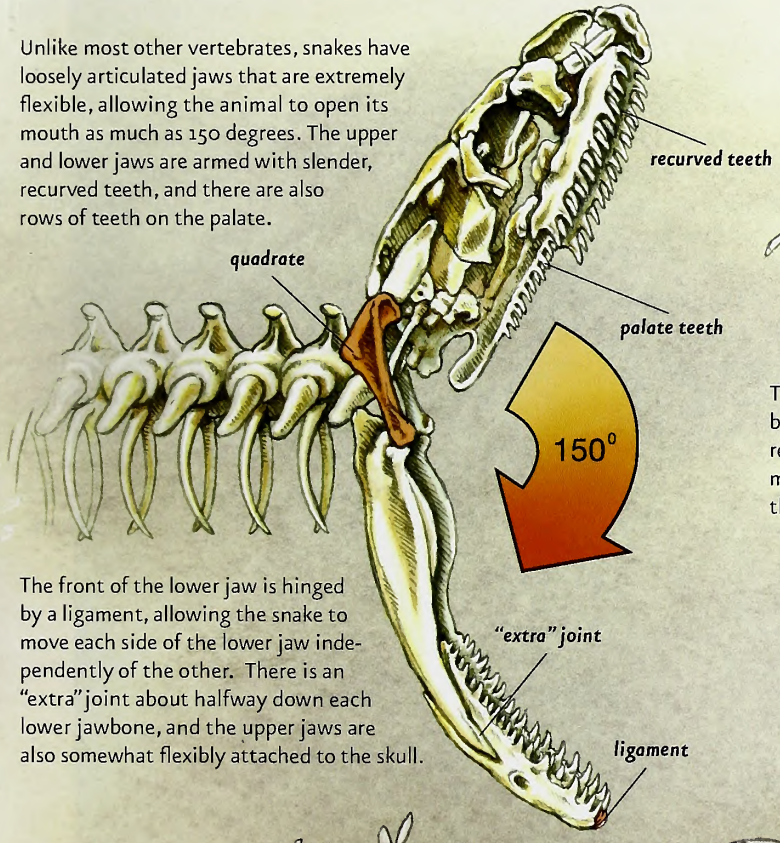
How Can Snakes Swallow Prey Much Larger than Their Heads?

written by Clyde Sorenson
illustrated by Jim Brown

FOR ANIMALS WITH NO LIMBS, SNAKES ARE remarkably effective predators. Most snakes tackle prey much larger than it seems they can swallow, and they have no ability to bite chunks off of a larger prey item. Snakes have a number of adaptations that allow them to swallow big prey whole.



Unlike most other vertebrates, snakes have loosely articulated jaws that are extremely flexible, allowing the animal to open its mouth as much as 150 degrees. The upper and lower jaws are armed with slender, recurved teeth, and there are also rows of teeth on the palate.



The front of the lower jaw is hinged by a ligament, allowing the snake to move each side of the lower jaw independently of the other. There is an "extra" joint about halfway down each lower jawbone, and the upper jaws are also somewhat flexibly attached to the skull.

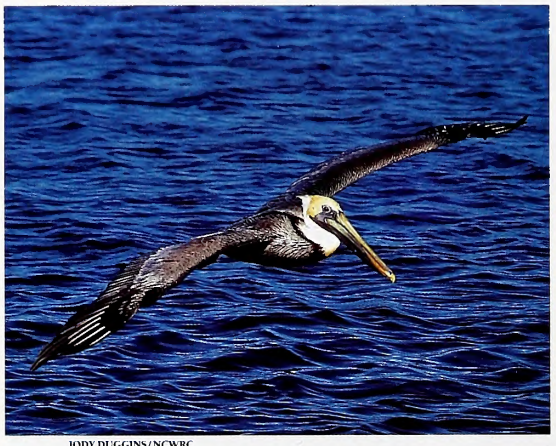
The loose, flexible jaws allow the snake to "walk" its jaws over the prey, by moving first one side, and then the other of each jaw forward. The recurved teeth prevent the prey from slipping backward. A snake swallows most large prey headfirst, so that feathers, fur and limbs lie down while the animal is swallowed.

It can take many minutes to swallow a really big animal. To breathe during such a protracted gulp, the snake everts the end of its windpipe out the side of its mouth.

Like Helican

written by Jim Dean

On a cool day this past fall with a stiff land breeze at my back, I sat on the beach and watched steel gray waves build over the sandbar and collapse in hollow curls. The waves were breaking so evenly—in perfect left-hand sets—that anyone competent with a surfboard would have been able to ride a long way. Indeed, there were plenty of surfers to watch—professionals who knew exactly how to get the most out of every wave without ever taking a spill or even getting their feet wet.



JODY DUGGINS/NCWRC

These surfers were brown pelicans flying in groups of a dozen or more strung out in single file just above the water. The pelicans would dip in front of a forming wave until their wingtips were nearly touching the water and glide effortlessly on the updraft in front of the wave. As the wave began to break on the shore, the pelicans would swing back over the top—still in line—and flap their wings briefly to head offshore where they would pick up another rising wave to surf.

It was a mesmerizing study in adaptation. Not only were the birds surfing the waves, each bird was perfectly spaced in line to draft behind the one in front of it. Geese flying in vee formation also take advantage of drafting and alternate the lead among the strongest adults to share the more demanding point position. The pelicans were moving swiftly, but because they were gliding on the updraft most of the time, they didn't need to swap the lead position very often.

"Watching such behavior is not only entertaining, it instructs us that nothing happens in nature without reason."

I suppose we've all seen pelicans surfing waves or the updrafts over sand dunes and marveled at their economy of energy. Watching such behavior is not only entertaining, it instructs us that nothing happens in nature without reason, even when that reason is not immediately apparent.

Some years ago, I was fly-fishing off Cape Lookout during one of the biggest runs of false albacore in recent memory. The albacore were there because the water was full of bait, vast schools of small silversides and anchovies. This had not escaped the attention of brown pelicans and various species of gulls. Some were diving into bait schools to pick up scraps left by feeding predator fish, while others were targeting the baitfish packed in dense schools for protection. So intense was the predation that balls of bait began to form under some of our boats, apparently seeking what scant refuge they provided.

The pelicans took quick note of this, and their feeding tactics changed to take advantage. More and more pelicans began to land and gather in tight bunches. Soon, some of the largest groups numbered more than 100 birds. As with the boats, balls of terrified bait gathered under the rafts of pelicans. The pelicans' scam worked like a charm, and they could now feed by merely dipping their bills and filling their pouches. As we watched, it became more and more evident that this energy-efficient behavior was intentional.

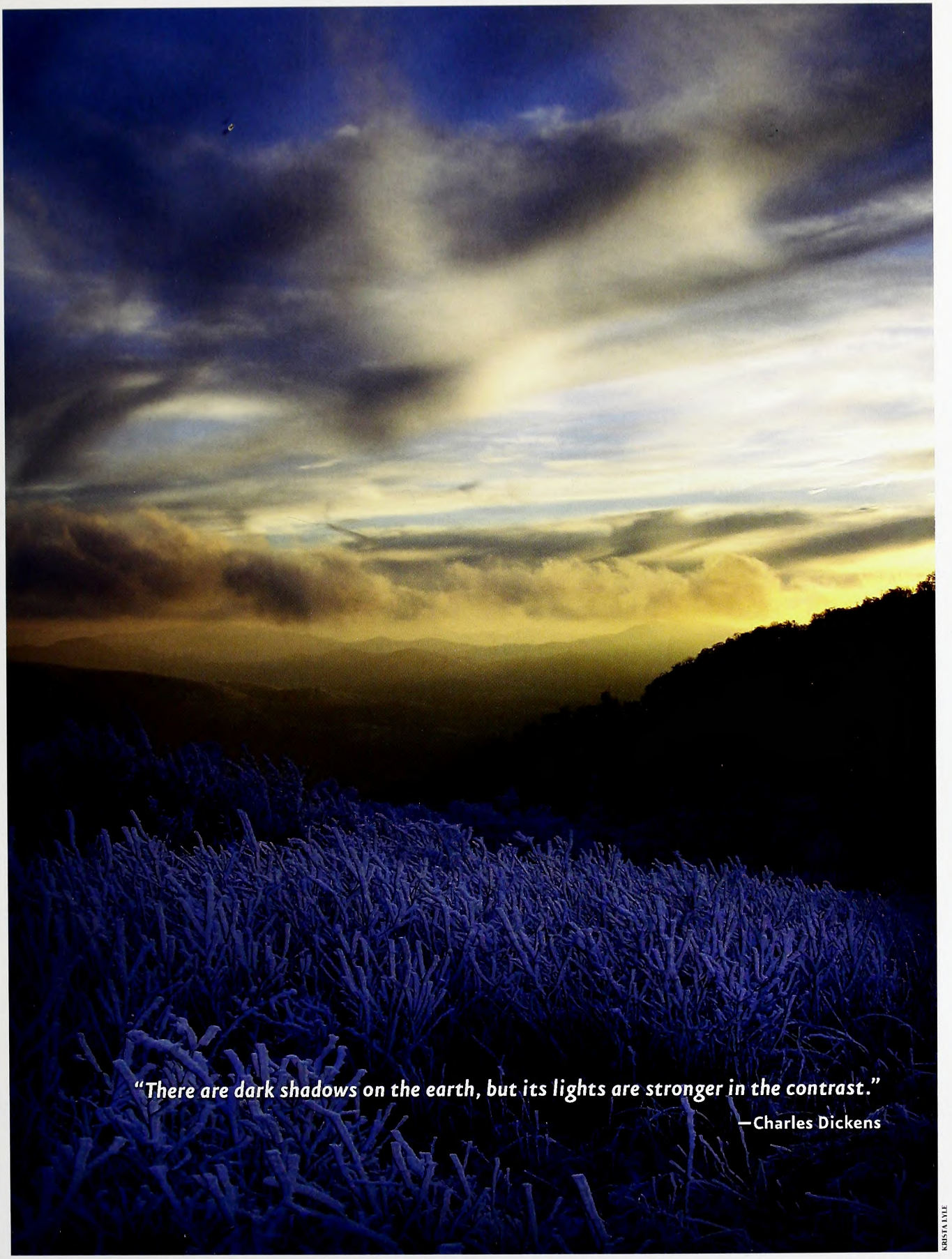
With tiny baitfish, pelicans either dive or dip their bills and fill their amazingly huge pouches with water and as many unfortunates as they have managed to capture. Then, they sit on the water slowing draining their pouches until they've isolated their meal and can swallow it. A pouch full of water is so heavy the birds can't fly until it's drained, and gulls often sit on the pelicans' heads during the process, hoping for a meal to escape. When diving to capture larger species of baitfish, pelicans apparently have less need to fill their pouch fully and wait for it to drain—perhaps they can "feel" these larger baitfish. The advantage is that they are able to fly off more quickly to avoid opportunistic gulls. A brown pelican's extended pouch can hold nearly three gallons of water, while its stomach capacity is only about a gallon.

Which brings us to Ogden Nash, who is widely credited as the author of this famous poem.

"A wonderful bird is the pelican,
His bill can hold more than his belican.
He can take in his beak,
Food enough for the week;
But I'm damned if I see how the helican."

Most scholars now agree that Dixon Lanier Merritt, rather than Nash, most likely penned this verse in 1910.

One thing about brown pelicans is not in doubt, however. The insecticide DDT, which causes excessive thinning of the bird's eggs, had so diminished the brown pelican numbers (and other species as well) that they were declared endangered in 1970. Only a few dozen birds remained in North Carolina, and none remained in Louisiana where it was the state bird. After DDT was banned, restoration efforts were so successful that brown pelicans were removed from the endangered species list in Atlantic Coast states in 1985. They are now more common than ever. That's good news for a very cool bird.



KRISTA LYLE

Beech Mountain

OUTDOOR MOMENT

IN THE FEBRUARY ISSUE

F. EUGENE HESTER

FROSTY FLYERS

Like watching winter songbirds? You can provide a buffet that will have them lined up at your feeder all season long.

CRABBY CREW

North Carolina's crabs come in many shapes and sizes, including the well-known blue crab, our main food species.

SPECIAL SPOT

One small spotted turtle's amazing journey brings up big questions about animals' attachment to their home habitat.

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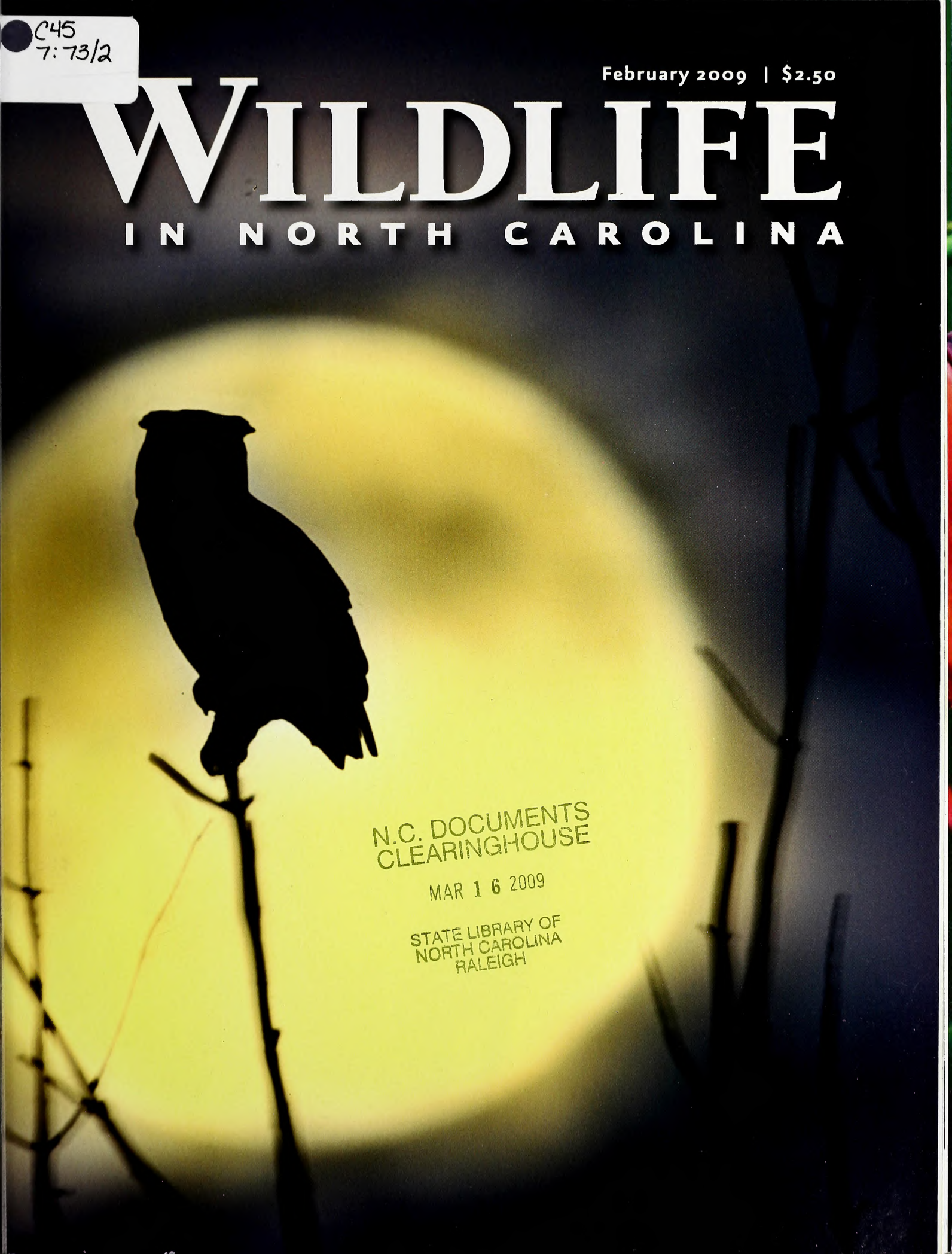
WILDLIFE IN NORTH CAROLINA



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The Northern flicker, left, and downy woodpecker are frequent visitors at backyard suet feeders statewide.

PHOTOGRAPH BY MASLOWSKI WILDLIFE PRODUCTIONS.

Volume 73 | Number 2

WILDLIFE IN NORTH CAROLINA

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Cover: The great horned owl is an efficient nighttime predator found commonly across our state. Its "horns" are tufts of feathers that have nothing to do with hearing. PHOTOGRAPH BY MASLOWSKI WILDLIFE PRODUCTIONS.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

What better month than February to take a look inside nature and explore what makes it tick? Much of the natural world seems to slow down in the coldest part of the winter, but a few creatures get even more active, choosing this frigid time to mate or begin the long journey back north.

LYNDA RICHARDSON

T. Travis Brown gives us a glimpse inside "The Little-Known World of Crabs" beginning on page 10. While some crabs head for deeper water during winter, land-dwelling species such as the ghost crab hibernate in burrows for weeks at a time, storing oxygen in sacs along their gills. Brown's story illustrates the similarities and differences in these creatures, which are often seen but poorly understood by many folks.

In "Exploring a New Ecosystem" (page 16), Sidney Cruze shows us the incredible symbiotic relationships of the American beech tree to the dozens of fungi, insects and animals it hosts. This story is the first of two features we are publishing this month and in March that include examples of artwork created by graduates of the botanical illustration program offered by the N.C. Botanical Garden.

Bob Palmatier, a former Durham elementary school science teacher turned author and illustrator, shares the story of "Stumpy's Return" on page 26. Stumpy is a spotted turtle that Palmatier's colleague found in a Raleigh wetland and moved to another wetland. Palmatier found the reptile a year later under unusual circumstances. This tale challenges long-held beliefs about moving animals from habitat that we believe is threatened.

You might also notice that you did not receive a copy of a publication that has shown up in your mailbox every couple of years for decades. Due to budget cuts, the new biennial report of the N.C. Wildlife Resources Commission was not mailed to all magazine subscribers. However, the publication will be available this month as a PDF document on the commission's Web site, www.ncwildlife.com. To request a print copy of the biennial report, visit the site or call (919) 707-0190. Whether you view it online or thumb through it in your easy chair as you hibernate, the report will give you a good look inside the Wildlife Commission's accomplishments of the past two years.

Greg Jenkins

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

FEBRUARY 2009 VOLUME 73, NUMBER 2

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Ruark Report

Excellent article on the life and writings of Robert Ruark ("Ruark in His Prime," Nov. 2008). "The Old Man and The Boy" literally changed my life. I grew up in a nonhunting household and was introduced to the sport by other young teenagers, none of whom (including me) had a single ethic among us other than to shoot something. Fortunately my uncle gave me a copy of the book in the late 1960s. Ruark's homey but philosophical prose, with the inherent message of "leave a few for seed" and "don't be a game hog" made me see that hunters are the original conservationists.

Anyone can take game unethically or illegally; it takes real skill to do it legally and ethically. From that time forward I wanted to make a career in natural resource conservation — and I have. All because of the seed planted by the powerful words of a world-class writer.

My mother tells me I met Mr. Ruark in Wilson, though I only vaguely remember it. I was playing with the son of one of his relations when he came to visit. I remember he was fascinated by the wooden go-kart we were building, and he picked me up and swung me around.

Lastly, and this is the big secret — I did my English book report on "The Old Man and The Boy" every year from the fifth grade through my senior year in high school. Got everything from a C to an A for virtually the same report.

Dick Brame
Wilmington

Good Dogs

Recently I was going through a stack of magazines to decide which to discard and which to keep. I always enjoy the issues of *Wildlife in North Carolina* and some even get read a second time before heading out to be recycled. In the Nov. 2003 issue a short article on page 36 is entitled "Prepare Dogs for Success Afield" which includes a picture of a handsome field setter. The article goes on to provide a list of things for a first-aid kit to carry for your favorite hunting buddy. I once had an English field setter with canine epilepsy and had to carry a special emergency kit with me that included two syringes and vials of valium.

My setter was a 4-year-old dog I rescued from an animal shelter and I had hoped to get her into a hunting club. I lost my girl to canine epilepsy in Dec. 2006 and she never made it into the field. I donated some of her blood to the canine epilepsy research at N.C. State University and they were grateful for another sample. Anyone with a pooch that has epilepsy or seizures can find information at www.carolinacanineepilepsy.com.

Willard Moore
Fuquay-Varina

Can We Duck A Disaster?

Joe Fuller provided all of us a great service with his article "Bad Days for Bluebills" (Dec. 2008). He summarized a tremendous amount of important information and helped us understand a broader view of the situation.

Although North Carolina waterfowl hunters might not notice a difference in local populations, Joe points out that the continental decline in numbers of scaup has been significant. In less than three decades, it has declined by 50 percent.

Many factors have been determined to impact populations at various times and places, leading to several theories as to the cause of the overall decline. Although a lot is known about factors affecting population numbers, it is not possible to conclusively identify the cause or causes of the decline on a continental scale.

As I read the article, I thought of similarities with Jim Wilson's article about the decline in river herrings ("Fish of Yesterday, Fish of Tomorrow," Oct. 2007). In both cases we knew a lot, but maybe not enough to take corrective action before the population was perilously low — maybe too low to make a recovery. I hope that is not the case with bluebills.

I feel reassured in knowing that many waterfowl biologists are working together to identify the cause and attempt to reverse the decline.

F. Eugene Hester
Deputy director (retired)
U.S. Fish & Wildlife Service
Springfield, Va.

The Power of Surprise

You have a very nice publication that I saw for the first time recently. A friend who knows of my love for woodcocks sent me the December issue containing "In Praise of the Bogsucker." Like author Clyde Sorenson, I used to hunt timberdoodles but quit when I no longer saw them in numbers that I felt could support hunting.

Sorenson's story of being knocked on his behind by a woodcock made me laugh especially hard because of an experience I had years ago. My young English pointer, Katie, pointed a woodcock one late afternoon. I crept up on the bird, hoping that Katie would respond to her training and breeding by standing stock-still.

About the time I approached Katie's right flank, the woodcock exploded into the air, inches from her chin. Startled, Katie leapt backwards and to the side, bowling me over onto the wet ground in a riot of arms, legs, fur and paws. I was not especially amused at the time, but I have enjoyed many good laughs from telling that story again and again over the years.

Oliver Yancey
Caldwell County

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

DERRICK HAMRICK

Fearsome Flying Tiger of the Night

Although undoubtedly intimidating to its prey, the great horned owl is simply a highly evolved predator doing exactly what nature intends.

Written by William H. Finck,

Every year, visitors to the wilds of the state come into close contact with a highly evolved predator without even knowing it. Even more jarring, they may actually observe its movements in the night around them, noticing its large, round eyes reflecting the light of their campfires.

What they see in the dark of the night is most likely a specimen of *Bubo virginianus*, the great horned owl, sometimes known as the flying tiger for its impressive capabilities as a hunter and predator. Although it might be easy for some to view these creatures as an ominous threat, that mistake belies an understanding of this highly evolved predator's role in the wilds of our state.

The Best of the Best

Not even eagles, peregrine falcons or Northern goshawks can match the horned owl's capabilities in hunting a wide variety of prey. Contributing to their diverse larder is the fact that horned owls are sexually dimorphous, with females often being larger than males. In North Carolina males average a little over 3 pounds, but females can weigh up to 4 pounds. This trait provides the great horned with a wide array of prey species from which a pair may select on any given night.

Standing 2 feet tall and boasting a 5-foot wingspan, the great horned owl is a common bird throughout its North American range, from the Aleutian Islands to Newfoundland and south to Nicaragua. The species is absent from the Isthmus of Panama and the Amazon basin but is widely distributed in Venezuela, Bolivia, the

The wings of a horned owl are both wide and long, like an eagle's, thus allowing for effortless, buoyant flight as well as an incredibly powerful lifting capacity.

Peruvian Andes and throughout central South America. This hemispheric distribution has resulted in the evolution of many different morphs, or subspecies, distinguished by variant plumages based on latitude and microclimate. Although there is a great deal of dissimilarity even among local populations, horned owls in the southeastern United States generally display a rustier coloration than their gray northern cousins.

The great horned owl's feathers are richly patterned in variations of maple, black and pale gray, with a buff undercoat barred with heavy streaks of chocolate. A clean white ruff, typically obscured, lies below the throat and is startlingly bared when the bird calls or makes a threat display. This cryptic coloration makes for excellent camouflage when the owl naps in the afternoons, perched on a tree limb near the trunk and elongating its body to blend into the bark. Tufted "horns" (plumicorns) used for both camouflage and nonvocal communication accentuate the deception. Though regurgitated pellets of indigestible hair, teeth and toenails on the forest floor may give away the owls' proximity, hunters and hikers routinely pass unknowingly beneath the dozing predators, whose ability to mold their feather conformation and body shape to blend into their environment is without parallel among American birds.

The Right Tools

All adult great horned owls have outsize eyes with radiant golden irises, jammed with rods to facilitate a night vision 100 times greater than our own. The eyes deliver vision 10 times sharper than ours and are fully the size of an adult human's—so large that they are immobile within their sockets. This physiological necessity gave rise to the owl's 14 neck vertebrae (twice as many as other birds have) and 270-degree head rotation. A semi-transparent nictitating membrane is used as a third eyelid to clean the lens and provide protection just before an attack. The pupils are capable of independent dilation, and the great horned owl, like many raptors, can stare unfazed into the noonday sun.

Supernal as is the horned owl's vision, its hearing is if anything even more astonishing. As with most owls, the great horned's eyes are set within concave partial facial dishes that channel the faintest vibration directly to the ears. As a crepuscular (dusk-and-dawn) specialist, the horned owl has no need for the full facial dish of the smaller barn owl, a creature able to track prey in laboratory-induced total darkness. The great horned may hunt throughout the night, especially when feeding young, but it is most active in the twilight hours and thus relies upon a combination of both sight and hearing. No sound escapes its constantly weaving, bobbing and spinning head, which acts as a radar dish funneling sound waves to the great ear canals, oriented at different heights on the owl's skull to aid in triangulating the source of noises. High-frequency emissions, higher even than the owl's own tonal range (almost all other animals hear best within their own tonal ranges) and far beyond the human register, are easily discerned and assist the hunter in locating prey.

Another adaptation to nighttime hunting is the great horned's low wing loading, a ratio of slight body weight to vast wing size that makes gliding all the more silent. The wings of a horned owl are both wide and long, like an eagle's, thus allowing for effortless, buoyant flight as well as an incredibly powerful lifting capacity—the great horned owl can carry off prey around its own weight. The flight feathers are specially modified as well, the windward edges endowed with a serrated fringe of down that acts to disrupt airflow over the wings, muting the whistle that accompanies the flight of birds such as ducks and doves.

Unwanted Attention

This astounding package of bodily traits meant to maximize hunting success sounds like the ultimate evolution of a night-flying

hawk, but the great horned, like all owls, is actually descended from the late Cretaceous divergence of orders Strigiformes (owls) and Caprimulgiformes (nightjars such as whip-poor-wills). In a marvelous instance of convergent evolution, the hooked bills, sharp talons, piercing eyesight and flying skills of the hawk family have been mirrored in these relatives of the gape-mouthed goatsuckers. How? Both hawks and owls consume in the same manner, and this particular ensemble of claws and feathers has proven itself over slow eons as the most efficient means of collecting vertebrate prey. For both diurnal and nocturnal birds of prey, to reverse Sigmund Freud's famous dictum, destiny is anatomy.

Although rabbits are a generally preferred target, prey species run the taxonomic gamut: crayfish, snakes, shrews, hares, gray squirrels, sandpipers, bats, rats, mice, fish, hawks, owls, pigeons, possums, herons, groundhogs, weasels, geese, woodpeckers, crows, porcupines, skunks and house cats—in short, anything the owl can physically overcome. Like accipiters (forest hawks such as the Cooper's and sharp-shinned), great horned owls hunt by perching on limbs and waiting in silence for their extraordinary senses to betray the presence of food on the ground.

From mice to groundhogs, the great horned owl's largely mammalian prey is seized near the base of the skull by zygodactylic feet (like a woodpecker's, with two toes in front and two opposing toes in back). The toes are fully feathered to keep them warm and usable in all weather conditions, and they can exert an incredible 500 pounds of pressure per square inch.

Ensuring the Future

Great horned owls mate for life but live separate from their mates for about a quarter of each year. After spending the fall and early winter hunting apart from one another, a mated pair is eager to renew its bond and begins hooting courtship serenades as early as October. The courtship ritual is purposefully seductive and even touching: After gentle hooting has lured her within range, the male softly approaches the larger female, strokes her with his bill, lowers his wings and

Great horned owls often appropriate abandoned nests of hawks, crows, herons or squirrels (top) to brood their young. Due to its excellent natural camouflage, a perched great horned owl can often be quite difficult to spot.

TODD PUSSER

MASTOWSKI WILDLIFE PRODUCTIONS

TODD PUSSER

TODD PUSSER

makes a series of solemn bows to her before renewing his tender caresses. Eventually the two fly off together to mate and find a home to rear their young, usually the abandoned nest of a hawk, crow, heron or squirrel situated 30 to 70 feet above the ground. If they are unable to find a suitable empty nest before the female is ready to lay eggs, the mated pair will simply appropriate an occupied one, driving away or killing the residents.

Usually two or three nearly spherical eggs are laid before the snow melts, with the male providing his spouse abundant prey while she broods the young. The owlets, hatched over time and thus of differing ages and sizes, are incubated by both parents for 25 to 30 days, with the young flying about two and half months after hatching. First, though, the fledgling owlets, having leapt from their reeking nest in the first of many displays of raw nerve, spend 10 days to two weeks waiting while their flight muscles gain sufficient strength for liftoff. During this time their devotedly protective parents feed and guard them.

By the time they are 10 weeks old, they are ready to fly, and the young often hunt together as they learn, by error and trial, how to do what horned owls do best. During this weaning period their parents feed them supplemental rations, but eventually the young are on their own as the parents chase them from their territory, then split up and take up solitary existences until the winter courtship comes around once more. As a great horned owl ages, it necessarily becomes a more proficient hunter. The ones who fail to learn or are crippled during this educational phase simply disappear.

A Close Encounter

A few years ago, having finally talked my then-girlfriend into a camping trip, I was comfortably ensconced at the campground of Pilot Mountain State Park. It was late November (an initial source of friction), and she and I were hunkered down by the side of a dying campfire. Preparing to turn in, she turned to me to say something. Then she looked over my shoulder, and her eyes widened. "Something was in that tree," she said, touching my arm. "I saw its eyes in the firelight, looking down right at us." Suspecting that it was, in fact, simply a great horned owl, I made a dutiful patrol around the perimeter with my flashlight, my mind on other things, and scanned the star-rimmed pines for the interloper.

Hours later I was awakened by a jarring sound far off in the woods. It went on for perhaps 10 seconds, and then there was nothing but silence. Thankfully my companion had remained asleep—this would have been the last straw, occasioning an immediate return to Raleigh. I determined that the sound I heard was likely a rabbit being taken by a great horned owl, supporting my theory about what my friend had seen in the trees above us.

The next morning, I tried to tell her what our visitor had probably been, to let her know that the owl she had likely seen was no threat to us and was in fact just fulfilling its natural role. The great horned owl had simply been investigating these transient visitors to its kingdom and, having satisfied its curiosity, without a sound had vanished back into the woods, where it had other business. ◆

William H. Funk lives in Virginia's Shenandoah Valley, where he is a freelance writer and an attorney focusing on land conservation.

She turned to me to say something. Then she looked over my shoulder, and her eyes widened. "Something was in that tree," she said, touching my arm. "I saw its eyes in the firelight, looking down right at us."

One of the great horned owl's most effective tools is its sharp talons (far left), surprisingly large even on juveniles (left). One of its most distinctive features, great horned owls' larges eyes are fixed within their sockets.

TODD PUSSER

mud fiddler crab

the little-known world of CRABS

North Carolina is home to an amazing number of these creatures in very different shapes, sizes and habits.

The lone crabber's boat drew a tight starboard circle as he let the steering wheel sit totally clockwise. He walked about the back of the boat, snagging buoyed traps as the craft drove itself in surprisingly consistent circles. Watching this crabber in May jump-started my interest in the world of crabs.

I was working as a biologist, sampling fisheries in a tributary of the Pamlico River, when the fisherman caught my eye. I was interested to know what he was hoping to catch and was soon to find out. The next morning, when we checked our fyke nets, I found myself in that fisherman's shoes as I lifted a net up to find a brilliantly colored blue crab. It was the first one I had ever seen, and it opened my eyes to a world of overlooked arthropods.

MR. POPULAR

Blue crabs, the major edible crabs in our area, are a staple in most Atlantic coast restaurants. Crab pot buoys and crabbing boats are common sights in the estuaries and sounds along North Carolina's coast. In fact, even during a bad year, in 2007, crabbing was an $18.1 million industry in the state. And that is 35 percent below average for the last five years. That makes blue crabs the most economically important seafood species in North Carolina.

In addition to its commercial value, crabbing is perfect for those searching for an activity that allows success for young outdoorsmen. For such a sought-after species, blue crabs are surprisingly easy to catch. Serious crabbers use wire mesh traps called crab pots, but all that is really required is a dip net or some quick, tough hands. My best success at netting, or "scapping," crabs has been at night. You just wade along the edge of a marsh or sound with a flashlight and net any crabs that you see. You can be even more successful by tying some fresh chicken, eel or other meat to the end of a weighted string. If you are in a good spot, crabs will quickly find the bait and latch onto it. Then you can slowly pull them to within dip-netting distance. There are in-depth books and pamphlets on crabbing available at many bait stores along the coast. They cover everything from catching to cooking blue crabs.

WRITTEN AND PHOTOGRAPHED BY T. TRAVIS BROWN

LYNDA RICHARDSON

Blue crabs are inarguably the most recreationally and commercially important crab species in North Carolina, but they are not the only one. Part of the joy of being a naturalist and a beachcomber is that there is always some new plant or animal to learn about. By looking at smaller things or looking in new places, you can discover something colorful or interesting waiting to be found, whether it is a new flower, salamander, fish or dragonfly. Crabs were one of these discoveries for me. On the surface, a crab is a crab, but if you look closer, there is a colorful world of creatures filling very different niches.

APPLES & ORANGES

The critters that most of us would call crabs fall into two groups (infraorders), Anomura and Brachyura. Anomura is a mix-and-match infraorder that includes hermit crabs, porcelain crabs and mole crabs, and Brachyura is made up of many species of true crabs' such as the blue crab. Going up the taxonomic ladder, crabs inhabit the order Decapoda (meaning "10 legs") along with lobsters, shrimp and crayfish, which all fall into separate infraorders. Horseshoe crabs, which share only a common name with most crabs, are in a totally different class (Merostomata) from other crabs (Crustacea). They are considered to be more closely related to spiders and prehistoric creatures than to crabs. All of these creatures, along with insects and arachnids, fall into the phylum Arthropoda, which means "joint leg."

male

MELISSA McGAW/NCWRC

female

MELISSA McGAW/NCWRC

Eggs from the two infraorders of "crabs" hatch into tiny plankton called protozoea or zoea. The zoea swim around as plankton until, after molting several times, they grow

SHERRY WHITE

LYNDA RICHARDSON

The blue crab (top) is North Carolina's most economically important seafood species. The males have blue-tipped claws, while the females' (top left) are red. The female carries fertilized eggs on her abdomen. The sponge-like appearance of the eggs spawned the nickname "sponge crab" for pregnant females. Blue crabs can be caught readily by both recreational (above left) and commercial fishermen.

JOE MALAT

into juvenile crabs. Some species, such as blue crabs, spend their plankton days in the open ocean. They then make their way upstream into our marshes and estuarine creeks to develop into adults. Methods for determining the gender of a crab vary by species. For instance, males of some species, such as blue crabs, have a distinct Eiffel Tower-shaped apron (crab lingo for the abdomen), and females have a more triangular or rounded apron. In fiddler crabs, the males have one enormous claw used in dueling and various territorial displays. Females have two similar-sized, small claws.

Crab species fill many marine and estuarine niches. They are generally scavengers, eating both plant and animal matter. Some of the smaller species, such as fiddler crabs, subsist on fungi and bacteria growing on decaying plant matter, but larger crabs feed on anything that they can catch or find dead. Many crab species, such as blue crabs, can be found in a wide variety of aquatic habitats (even a freshwater lake in Kentucky), and some are highly specialized. For instance, North Carolina's fiddler crabs have carved up the salt marsh into niches for three species. Although the niches overlap, sand fiddler crabs generally inhabit the sandy upper limits of the salt marsh, mud fiddler crabs inhabit the muddy lower marsh, and brackish-water fiddler crabs reside in the portions of the marsh where freshwater enters. In other words, as you walk from the beach into the marsh, you will often encounter sand fiddlers first and then mud fiddlers, and if you walk up into the mouth of a freshwater creek, you may begin to see brackish-water fiddler crabs.

THE NEIGHBORHOOD

In fact, marshes are excellent places to find many species of crabs. Around docks and under logs near the marsh, you may spot the square-bodied marsh and wharf crabs. From a distance, they resemble spiders running for cover, but these are actually small crabs with harmless pincers. Several species of mud crabs can also be found in the marsh. These thick-shelled species are relatives of the edible stone crab. Their claws are powerful enough to crush half-inch clams and chip away at larger clams, oysters and barnacles. You may also be surprised to find some species of diminutive crabs living inside or under oysters, mussels, tube worm burrows, keyhole urchins and sand dollars. These crabs, often smaller than a dime, may be one of several species, including pea crabs, oyster crabs, mussel crabs and urchin crabs.

The beach also can be a good place to find crabs. Ghost crabs dominate this habitat. You may only see their tracks and burrows during the day, but at night they haunt

SCOTT TAYLOR

SAM BLAND

MIKE DUNN

Among North Carolina's many species of crabs are (counterclockwise from top left): hermit crab, wharf crab, marsh crab, fiddler crabs, mole crabs or sand fleas, and porcelain crab.

the sand, scavenging for anything edible washed up along the wrack line, where waves toss up the ocean's bounty. These fast, opaque little predators may startle you when your flashlight first hits them, and they often disappear by the time your light swings back in their direction. Some other beach crabs are a little easier to find during the day. Perhaps the easiest is the speckled crab, a close relative of the blue crab, which can often be seen swimming or walking in the surf before it buries itself in the sand. Also inhabiting the surf zone are mole crabs. These anomuran crabs bury themselves in the highly unstable surf zone. Here they take a pounding, but they are constantly provided with newly washed-up food.

NIGHTTIME BEACHCOMBING HAS BECOME MY FAVORITE WAY OF ENJOYING THE SHORE DURING WARM MONTHS, WHEN DROVES OF PEOPLE PREVENT ONE FROM SEEING MUCH WILDLIFE DURING THE DAY.

The beach can provide a glimpse into the world of crabs that inhabit the more inaccessible parts of the ocean. Crab parts washed up on the beach have taken me on a poor man's scuba diving trip many times. They provide a glimpse into what is happening in the offshore shipwrecks, sargassum (seaweed) beds, reefs and rock outcrops. You may find the huge, heavy claw of a stone crab or the giant spiderlike leg of a common spider crab. I have often found the brightly colored carapaces (hard outer coverings) of purse crabs, lady crabs and shore crabs mixed in with seashells. Floating mats of vegetation, dead jellyfish and other types of rafts are good places to check for a crab stowaway. Young common spider crabs make a habit of riding in the bells of mushroom-cap jellyfish. Who knows, you may even find a sargassum crab in a washed-up mat of seaweed. Christopher Columbus described seeing them in mats of floating sargassum centuries ago.

CALM OBSERVATION

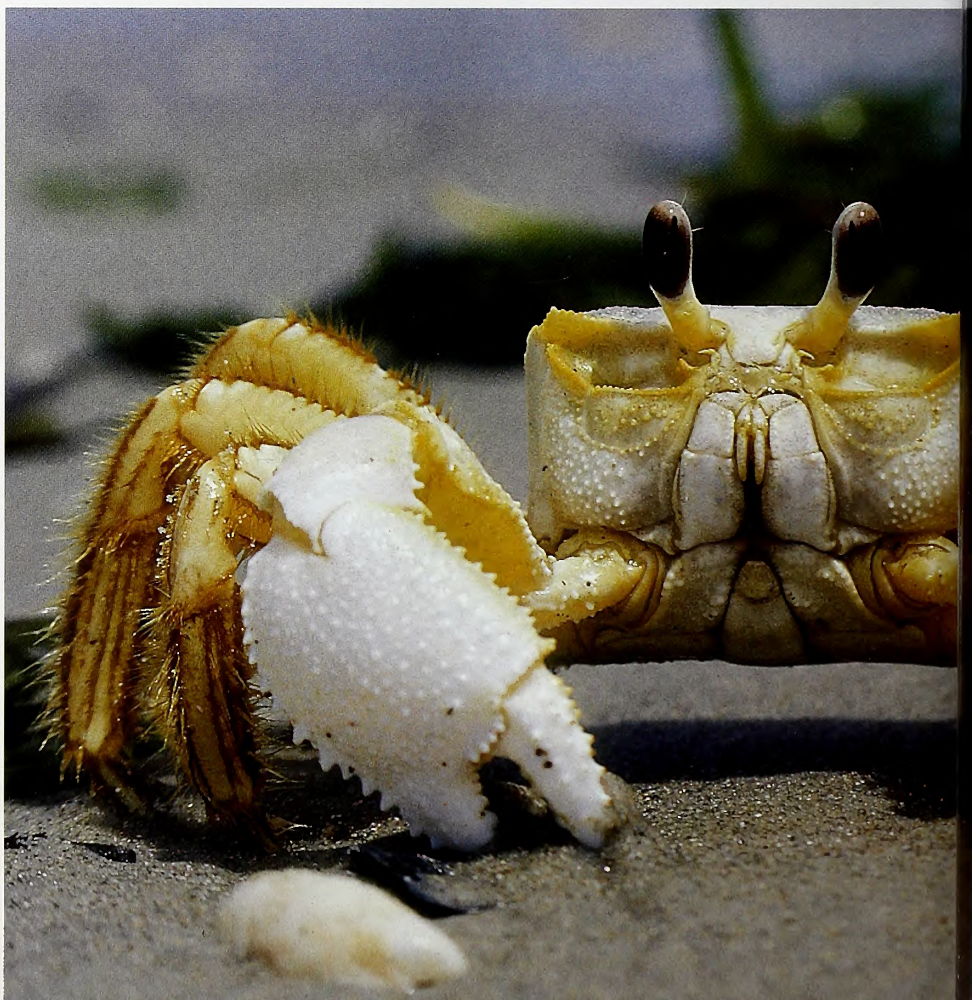
No habitat has been as kind to this beachcomber as has been the sound. Seeing my first handsome blue crab certainly sparked an interest in crabs and left me wanting to know about some of the smaller crab species that my fellow biologists and I caught while surveying fish.

However, nothing piqued my interest in crabs more than one night of wading around the back side of Wrightsville Beach with a flashlight. The waters were unseasonably warm for December, and my father-in-law and I were searching the low-tide beach for shells and stranded sea creatures. We followed the beach around the inlet to the sound side of the island. The calm waters allowed us to peer into a world that was quite active compared to the desolate beach. That night we saw a purse crab, blue crabs, speckled crabs and many mud snail shells being carried around by long-clawed hermit crabs.

Nighttime beachcombing has become my favorite way of enjoying the shore during warm months, when droves of people prevent one from seeing much wildlife during the day. The warmer months increase the number of crab species and their abundance in shallow waters, since many crabs head to deeper water during winter. Also, being close to an inlet may provide a glimpse at some deep-water refugees from storms or strong currents. Daytime trips to the sound have also yielded smooth porcelain crabs, blue crabs and speckled crabs.

My favorite crabs to look for during nighttime beach excursions are the hermit crabs.

SAM BLAND



MIKE DUNN

North Carolina's crabs vary considerably in shape, size and color, as seen in this selection of Tar Heel species (clockwise from top left): speckled crab, lady crab, black-fingered mud crab, spray crab, ghost crab, spider crab (juvenile) and purse crab.

They range from the pipsqueak long-clawed hermit crab to the comparatively gargantuan flat-clawed hermit crab. In fact, hermit crabs are a hit with many people and are magnets for children. The number of hermit crab species (four to six) in North Carolina waters is one thing, but the diversity of their shells is astounding. They use a variety of discarded shells ranging in size from tiny auger and mud snail shells to moon snail shells and even full-grown whelks.

Many of the shells have become miniature ecosystems all their own. In fact, one study found that more than 500 species are known to live on or cohabit hermit crab shells. Of these, more than 100 species appeared to require hermit crabs for their existence. Hermit crab shells can be covered with or coinhabited by anemones, barnacles, small arthropods, polychaete worms and various cnidarians such as the aptly named "snail fur." Many large hermit crab shells begin to resemble walking coral reefs.

A GRIPPING PASTIME

I have listed many of the common North Carolina crabs, but these are not the only ones that you may find washed up on the beach or crawling slowly along the bottom of a sound. North Carolina occupies a unique position where both southern and northern species overlap.

Also, alien species may hitchhike on boats or be introduced by saltwater aquarists. For instance, the green crab, an import from Europe, has colonized many of the waters along the Atlantic coast. Species such as the green crab could have negative effects on native species, many of which are important to North Carolina incomes.

To learn more about these fascinating creatures, check out the "Peterson Field Guide to the Atlantic Seashore" and the "Peterson Field Guide to the Southeastern and Caribbean Seashores."

Also, North Carolina Aquariums provide you with unique opportunities such as a chance to actually touch hermit crabs and horseshoe crabs, and some of their tanks house deep-water species that most of us will usually see only washed up on the beach. Most important, you now have another excuse to wander the beaches and sounds of North Carolina's coast. ◆

Biologist T. Travis Brown works in the southeastern United States, including North Carolina.

NATURE'S WAYS

How can Ghost Crabs Run so Fast?

See Nature's Ways, page 39.

Exploring A New Ecosystem

written by SIDNEY CRUZE *& illustrated by* EMMA SKURNICK, GEORGIA MINNICH *and* DALE MORGAN

ACTING AS A HOME TO AN AMAZINGLY BROAD AND THRIVING ECOSYSTEM OF LIVING THINGS, A SINGLE AMERICAN BEECH TREE IS A WORLD WAITING TO BE DISCOVERED.

The American beech is an arboreal aristocrat. Its graceful form, glossy green leaves and smooth, silvery bark make *Fagus grandifolia* a beauty among hardwoods. But there is more to the species than meets the eye. With a high tolerance for shade and the ability to produce numerous seeds and clone itself through root suckering, the American beech can survive for centuries, making it a powerful force in forest ecology. The tree provides valuable food for wildlife and sustains relationships with a diversity of forest organisms.

A close look at a single American beech — the roots, the trunk and the crown — reveals that each tree is an ecosystem ready to be explored.

A Climax Species

American beech trees once inhabited areas as far west as California, but today you'll find them only on the eastern half of our continent, from the Florida panhandle north to Cape Breton Island, Nova Scotia. In North Carolina their habitat ranges from the maritime forests on our barrier islands to elevations above 4,500 feet. They are common in the Piedmont, where they dominate the mixed hardwood forests found in ravines and on steep north-facing slopes.

Beech trees grow in myriad distinct forest types across the state, alongside Southern sugar maple, white oak, water oak and other hardwoods. As these forests evolve, different trees play different roles. The pines are pioneers because they invade early and grow quickly in high light and poor soil conditions. A beech on the other hand is the tortoise that wins the race. "At the end of forest succession, in the right habitat, beech will be dominant because they are the most shade tolerant," says Andy Walker, the millennium seedbank coordinator at the N.C. Botanical Garden. "That's why they're so special, because it takes a long time for them to grow. When you see a beech grove, the space feels almost spiritual, because the trees call you to respect an unaltered piece of nature."

ILLUSTRATIONS BY EMMA SKURNICK

American Beech *Fagus grandifolia*

Root Relationships

Spring is an ideal time to wander through beech groves. The trees prefer rich, moist, well-drained soil, which supports a lively display of flowering ephemerals. As you scan the forest floor for hepatica and trillium, watch for the beech tree's shallow gray roots. Like other tree roots, they draw nutrients from the soil. But beech roots don't do this alone; they have subterranean helpmates called mycorrhizae.

In a healthy forest, the soil is alive with fungi comprised of a large mass of threads and a fruiting body. Beneath the forest floor, fungi wrap around beech tree roots, then they reach their filaments into the soil. By doing so, they extend the tree's root system and increase its ability to absorb nutrients. They break down and absorb materials such as phosphorus-containing rock and make them available to the tree. In return, the fungi take sugars that the tree creates through the process of photosynthesis.

Above ground, the fungi's fruiting bodies appear as mushrooms—your clue to the fungus-root relationship formed below. Two types seen often near beech trees in North Carolina are *Amanita muscaria* and *Boletus frostii*. Both are red and easy to recognize. Widely regarded as poisonous, the amanita has a large, white-gilled, white-spotted cap that looks like a fairy tale toadstool. The boletus has a coarsely ridged red stem and is found in the spring and summer.

Thin-Skinned and Vulnerable

Stand next to a beech tree and run your hand along the trunk. Feel the bark's smooth texture. Unlike most trees, a beech has bark that continues growing at the same rate as the trunk during the entire life of the tree. The process produces a thin gray surface that wrinkles like elephant skin where limbs were once attached to the tree.

The tree's thin bark makes it easily accessible to sucking insects, and one of the most dramatic is the beech blight aphid. Dense colonies of these fuzzy-looking insects appear in late summer or early fall. "The aphid secretes white waxy filaments from its abdomen. If disturbed, it will raise and sway its body in defense," says David Stephan, an Extension Specialist in the Department of Entomology at N.C. State University. "When you tap on a covered branch and see this pulsating mass of filaments, it's quite a sight."

The aphids don't harm beech trees, but they do produce a sticky substance called honeydew that attracts destructive-looking fungi. The fungi, known as sooty molds, colonize the honeydew and turn it black. One mold specific to beech blight aphid colonies is *Scorias spongiosa*. "The fungus creates a big ugly mass that looks like a ratty, torn-up sponge," Stephan says. "It doesn't harm the tree, it just looks awful."

Scale insects such as the oyster-shell scale can damage beech trees, but the biggest threat is the beech scale, which causes beech bark disease. The scale attacks the tree's bark, making it susceptible to the nectria fungus. Once established, this scale-nectria complex can kill up to 80 percent of the trees in a forest. Beech bark disease traveled from Europe to North America on ornamental trees, arriving in Nova Scotia in 1890. Just over 100 years later, it was reported on the North Carolina–Tennessee border, in the beech gaps near Clingman's Dome. "We know it's in the Mountains, but it hasn't spread to the Piedmont or the Coast, and we're not sure why," Stephan says. "The question is whether it's going to become a major problem or remain a minor one. Nobody can say at this point." Dave Houston, a retired plant pathologist from the U.S. Forest Service, expects the disease to gather momentum as it spreads south. "The scale does very well in warm conditions," he says.

A World at Eye Level

From a few feet away, a beech trunk looks dappled with paint. But get inches from the tree, and you'll discover pale pink and green spots filled with tiny dots and squiggles. These light patches are lichens, organisms created by an association between algae and fungi, and each is made up of a body—the thallus—and the fungi's fruiting bodies. The lichen are epiphytes that live on the tree without harming or helping it. "The tree is just a place for lichen to live. They get all their nutrients from the air, so they're really more indicative of air quality than the tree's health," says Gary Perlmutter, an environmental specialist with the N.C. Department of Environment and Natural Resources.

The beech trunk's even surface makes it the perfect host for lichens, and a single tree can be home to as many as 20 different species. "You can find the leafy-looking foliose species on a beech, but they're often near the roots, where the bark is rougher," Perlmutter says. "The trunk is usually covered with crustose species, which look like thin crusts on the tree." One of the most beautiful types is the common script lichen. Set against a gray-green thallus, its fruiting bodies form intricate patterns reminiscent of ancient Sumerian writing. Another is the "ochre" comma lichen

Beech Blight Aphid
Grylloprociphilus imbricator

ILLUSTRATION BY GEORGIA MINNICH

a pale, orangey splotch outlined in black, like a country on a map, and filled with dot-shaped fruiting bodies.

The lichens are visible to the naked eye, but bring a hand lens to see their many textures and colors. Slice a lichen open, and you might find some of the forest's smallest creatures hiding inside. "They are microscopic insects called water bears, which is the common name for tardigrades. They live in the lichens' fruiting bodies and can hibernate there for years," Perlmutter says.

Common Script Lichen
Graphis scripta

ILLUSTRATION BY DALE MORGAN

Up in the Canopy

Look up into the branches of a mature beech tree during the winter. You'll see an oval-shaped crown that can stretch 80 feet wide. The tree's long, thin pointed leaf buds look and feel needle sharp. Beech leaves emerge from the buds in spring to form feathery tassels that later become ovals with serrated edges. By summer they are a deep emerald on top, with a paler shade underneath.

At least 60 species of butterfly and moth larvae make beech leaves a part of their diet, but one, the prized early hairstreak, shows an especially strong preference for them. The tiny gray-green butterfly lives on the edge of northern hardwood forests, and its habitat extends from the Southern Appalachians to New England. In North Carolina, it is found in only a handful of western counties. "For a long time people thought early hairstreaks fed exclusively on beech trees, but we now know they also feed on the beaked hazelnut," Stephan says. "The adults spend a lot of time perched high up in the beech canopy, which may be why they are so hard to find."

Beech leaves also provide food for fall cankerworms, gypsy moths and caterpillars such as the yellow-striped saddled prominent. Large infestations of these insects can defoliate a beech completely.

During the fall, the leaves turn light tan, and unless the wind blows them down, they will stay on the tree through winter. As the weather cools, the beech tree's sweet-tasting seed attracts both people and wildlife. Beechnuts ripen and turn brown inside spiny husks between September and November, and they fall to the ground after the first heavy frost causes the burs to open. The small pyramid-shaped nuts are hard to harvest—trees can take more than 40 years to produce regular crops, which then occur only every two to eight years. Still, many consider the quest for the beechnut's woodsy taste to be worth the work. People eat them one at a time, grind them as a coffee substitute or add them to bread and cookie dough. Farmers also use them to supplement livestock diets.

In the forest, chipmunks love beechnuts, and ruffed grouse, wild turkey and black bears rely on the seeds for food. Before they became extinct, passenger pigeons flocked to beech groves in numbers so large that their weight broke tree limbs. "This association was so strong that in Audubon's illustration of the passenger pigeon, he drew the bird on a beech tree," Walker says.

Woodpeckers, nuthatches, titmice, crows and grackles all feast on the seeds, and a blue jay, with its expandable esophagus, can fit as many as 14 beechnuts in its throat at one time. In fact, this common noisy bird plays a significant role in planting beech trees. Each fall blue jays gather beechnuts by the throatful, then disgorge them into piles before burying them in the forest litter. The birds deposit the nuts one at a time in different places, usually near evergreen conifers, in a circular or semi-circular pattern that can spread miles from the food tree. "One jay can bury up to 1,500 seeds in a fall," Houston says. "By placing the nuts in relationship to conifers, a blue jay can use these green beacons to mark his food cache. By hiding the beechnuts under leaves and next to the soil, he puts them in an excellent position to grow into trees the next spring."

Planting the Future

A year later a beech seedling will measure less than 12 inches high. At 40 years old, the still-young tree will reach almost 30 feet. In ideal conditions, an American beech will live for 250 years, growing more than 80 feet tall.

Observing a vibrant ecosystem centered on something as relatively small in scale as the American beech tree offers appealing opportunities for nature enthusiasts. As the beech tree reaches up into the forest canopy, spreading out over the bloodroot and spring beauties, it offers a world waiting to be found. ◆

Sidney Cruze is a freelance writer who lives in Durham. She writes about land conservation and sustainable agriculture in North Carolina.

Illustrator Emma Skurnick is an instructor for the certificate program. Dale Morgan and Georgia Minnich are graduates of the program.

A Growing Art Form

The N.C. Botanical Garden's Certificate in Botanical Illustration program provides comprehensive courses in botanical illustration to those who wish to improve their skills in drawing and painting plants in a technically detailed manner. Studies leading to the certificate enhance the experience of both the professional and the dedicated amateur botanical artist in accurately portraying artistic and scientific images.

The program is designed to give enrollees a well-balanced curriculum combining a basic scientific background in botany with visual arts theory and practical experience using various media, including graphite pencil, pen and ink, colored pencil, and dry-brush watercolor. Classes are taught by the garden staff and other area art and botany professionals. For more information about the program, contact the N.C. Botanical Garden at ncbg@unc.edu or (919) 962-0522.

Providing PROVISIONS

Winter feeding supplies nourishment for both birds and the humans who watch them.

WRITTEN BY *F. Eugene Hester*

MASLOWSKI WILDLIFE PRODUCTIONS

One cold day last winter, small birds were flocking to my bird feeders. There were Northern cardinals, Carolina chickadees, tufted titmice and Carolina wrens, all at the feeders at the same time. In cold weather they need a lot of energy, and they were getting it there.

All across the state there are bird feeders of numerous designs hanging next to windows. They provide a benefit both to the birds and to the humans who enjoy watching them.

FEEDING THE HABIT

Although I have been feeding birds for decades, I learn something new from every person I talk with who shares this interest. Recently I talked with Sandy Partin of Raleigh about her experiences at feeding birds over the past 10 years. Her enthusiasm and dedication have steadily increased, and now her beautiful yard is adorned with several types of feeders and birdbaths. Sandy showed me nearly a dozen types of feeders, including a screen shelf mounted to her deck rail, a suet feeder, a tube feeder for thistle, a Droll Yankee hopper mounted on a 10-foot pole, an electric squirrel-proof sunflower-heart feeder, a bell feeder and some ground-feeding spots. She also has several sugar-water feeders.

She knows that some species of birds eat mainly insects and that others prefer seeds or fruits, and by providing several types of food, she increases the variety of birds she attracts. She provides roasted shelled peanuts, peanuts in the shell for jays, sunflower hearts, woodpecker suet, thistle, berries, grape jelly, chunky peanut butter, oranges, mealworms, bluebird soy nuggets and black oil sunflower seeds. At times she also adds apples, grapes and other fruits and berries.

"I give my birds any berries or fruits that I eat while they are in season," Sandy said. "That includes blueberries, raspberries, grapes, apples, oranges and figs. My screen shelf feeder attached to the deck rail draws larger birds that otherwise would not feed at the hopper feeder on the pole. From October until April I place jar lids filled with crunchy peanut butter and other lids with grape jelly for the Baltimore orioles. I also put orange halves on the screen and leave sugar water out all year long. When the hummers leave, the orioles take their place. Chickadees also have a sweet tooth. Everyone likes the peanut butter—squirrels drive us crazy."

Dark-eyed juncos (previous page), Carolina wrens (below right) and Northern cardinals are three of the common species that flock to bird feeders in North Carolina.

F. EUGENE HESTER

F. EUGENE HESTER

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MASLOWSKI WILDLIFE PRODUCTIONS

Everybody who has ever fed birds has trouble with squirrels and sometimes other mammals, including chipmunks, raccoons, opossums and, in some areas, even bears.

UNWELCOME GUESTS

Everybody who has ever fed birds has had trouble with squirrels—and sometimes other mammals, including chipmunks, raccoons, opossums and, in some areas, even bears. Squirrels are incredibly smart and agile. They can jump surprisingly long distances, walk on wires, run on ice-covered limbs and overcome most obstacles placed in their way. Sandy has her share of problems with the furry pests. She says, "I have tried hot pepper powder and pepper spray, but we have squirrels that seem to love the spicy cuisine." The one solution Sandy has found is a feeder with two solar-powered metal perches that give a squirrel enough of an electric shock to prevent its return. Because birds use only one perch, they are not affected. And as for any rats or mice or other small rodents that might feed on grain that falls to the ground, Sandy says, "Neighborhood cats take care of the small rodents. If they would just take care of the squirrels!"

SOME TLC

For a special treat, Sandy makes a type of homemade suet. She uses 1 cup of lard or bacon grease, 1 jar of crunchy peanut butter, 1 cup of oatmeal, 1 cup of cornmeal, and 2 cups of birdseed. She melts the lard, adds the peanut butter and mixes it with the other ingredients. She then puts it into loaf pans in the refrigerator. After it chills, she cuts it into sections to fit her suet feeder and then puts the pieces in zip-lock bags to keep in the refrigerator until they are needed.

Sandy has found that various bird species vary in their feeding habits as well as their choice of foods. Her hopper feeder attracts house finches, Carolina wrens, brown-headed nuthatches, white-breasted nuthatches, pine warblers, cardinals, sparrows, towhees, tufted titmice, chickadees and grackles. Her sunflower-heart feeder attracts finches, cardinals, bluebirds, titmice and chickadees (the solar-powered electric shock keeps the squirrels away). Goldfinches and house finches enjoy her tube thistle feeder, and cardinals, jays, thrashers, Carolina wrens, catbirds, mockingbirds, Eastern towhees, Baltimore orioles, grackles, red-bellied woodpeckers, robins and even one bold crow come regularly to her screen shelf feeder. Woodpeckers and other birds that feed mainly on insects visit Sandy's suet feeder. These include Northern flickers; downy, hairy and red-bellied woodpeckers; bluebirds; catbirds; and Carolina wrens. Sandy even has a red-tailed hawk that comes to feed on the chopped chicken parts she provides for it.

FRIENDLY NEIGHBORS

Feeding birds is a yearlong activity for Sandy. In spring when her bluebirds begin nesting and hatching, she puts mealworms in a pole-mounted dish at 7 a.m. and 6 p.m. She then calls the bluebirds to the feeder. "Problem is," she says, "all my other hungry parents come too. It's kind of like going to the Krispy Kreme store when the red light is on."

Some birds have accepted Sandy so well that they will not only come to the feeder while she sits nearby on her deck but will even eat from her hand. "We are old friends," she says. "Brown-headed nuthatches, pine warblers, titmice and a female cardinal will each eat mealworms from my hand." Sandy has named several of her birds. She calls the female cardinal Georgia, and the bold crow Percy.

Sandy obviously enjoys the interesting behaviors some birds have. She says that the bluebirds wait at feeding time and expect to be fed. Percy, the huge crow, is the only crow that visits. He has no problem as he feeds on the screen shelf while the other crows keep their distance. "If he stops by and I haven't left him any bagels, sautéed veggies, Fig Newtons or some type of cookie," Sandy says, "he will call me out of the house. He is the only crow in his flock that will come into the yard, and he comes to the deck. A red-bellied woodpecker named Buzz likes to come to the third-floor gutter and hang upside down before he dives, wings folded, to the feeder. His mate is Buzzette, and their new son is Gunner (he flies out of control from the trees to the feeder and usually falls or misses the landing). Georgia, the female cardinal, is completely bald this year (looks like a buzzard). Reuben the Robin is the most gluttonous one around the mealworms," she continues, "and I have to cut him off after 10 to 12 worms each trip."

MORE GUESTS

Farther west near Statesville, Garland Pardue also feeds birds. He has hopper feeders and a shelf feeder fixed on metal poles with a predator guard, and a suet feeder attached to a tree. He gets several species in addition to those Sandy attracts to her feeders in Raleigh. Garland fills one hopper feeder with black oil sunflower seeds and one with white proso millet. The suet feeder is a commercial wire

MASLOWSKI WILDLIFE PRODUCTIONS

F. EUGENE HESTER

Chickadees (top) will be seen frequently at hopper feeders, while red-bellied woodpeckers find nourishment at suet feeders.

MASLOWSKI WILDLIFE PRODUCTIONS

F. EUGENE HESTER

MASLOWSKI WILDLIFE PRODUCTIONS

Different feeders attract varying species, from red-breasted nuthatches (top left) to towhees (top right) and house finches and goldfinches.

mesh basket attached to a tree and filled with a mixture he prepares by mixing one part bacon grease, one part flour, one part peanut butter and three parts cornmeal. Either whole or cracked corn is placed on the shelf feeder.

Cardinals, tufted titmice, chickadees, house and purple finches, nuthatches, goldfinches and woodpeckers primarily use the black oil sunflower seeds. Sparrows, especially chipping sparrows, cardinals, and indigo buntings visit the millet feeder. Mourning doves will eat the millet on the ground and will feed directly from the millet and sunflower feeders if a stick or limb is attached to the base of the feeder for use as a perch.

Garland enjoys watching the birds and studying their interesting behavior. He says, "Red-bellied, downy and hairy woodpeckers invariably alight on the tree above the suet feeder and work their way downward in an upright position to the feeder. White-breasted and brown-headed nuthatches usually alight above the feeder and work their way downward headfirst. All of them also use the black oil sunflower feeder and fly directly to its rim. Woodpeckers and nuthatches usually get one seed from the sunflower feeder and then fly to a nearby limb or tree to open and eat the seed, as do chickadees and titmice. Finches, cardinals and chipping sparrows may stay at the feeder until they are filled or run off. At times, there may be as many as five to 10 finches at the feeder." Brown-headed nuthatches and chipping sparrows are very tolerant, but white-throated, song, field and fox sparrows are much more wary.

UNWANTED ATTENTION

Everybody who feeds birds has problems with other species also being attracted. Garland says that hawks, especially red-shouldered and Cooper's, learn about his feeders and regularly patrol the yard. Squirrels, chipmunks and flying squirrels use the suet feeder and the sunflower feeder, and squirrels even use the millet feeder when they can't get to the others. Chipmunks and mice will dig burrows near the feeders and eat the dropped seeds from the ground. Garland says that by late spring brown-headed cowbirds and common grackles become so numerous and so obnoxious that he usually stops feeding until they leave in the fall.

BED AND BREAKFAST

Garland attracts some unusual birds, mainly in the spring when they migrate northward. He said, "Some, like pine warblers and goldfinches, stay around for the summer. Others, such as evening and rose-breasted grosbeaks, indigo buntings, Baltimore orioles and juncos, stay at the feeders for several days to several weeks and then move on. I also have numerous robins, bluebirds and usually yellow-bellied sapsuckers and pileated woodpeckers in the area around the feeders, but I have never seen them at the feeders. I also have barred, screech and great horned owls in the area around the feeders at night on occasion."

Garland also attracts more than bird species to his setup. Flying squirrels especially like the suet feeder at night and are often seen when the outside lights are turned on.

MASLOWSKI WILDLIFE PRODUCTIONS

connection with the natural world around them. And this is something that is very important to them.

Garland said, "Feeding the birds is one of the great joys in life. It gives you the opportunity to see beautiful animals, learn about their behavior and even photograph them doing various activities around the feeders. I would feel a great void in my life if I did not put feeders up each year." Sandy struck a similar note, pointing out that although she can sometimes spend as much as $100 a month on bird food, "My husband has decided that the bird food is cheaper than a therapist."

Frequent contributor F. Eugene Hester is retired from the U.S. Fish and Wildlife Service.

Tufted titmice (left) are common visitors to feeders. Baltimore orioles often are attracted to offerings of fruit.

My own experiences have been similar to those of Sandy and Garland, but I have also erected feeders in several additional habitats, including woodland areas and hedgerow-type thickets. Simple beef fat, if placed in a suet cage and hung high on a tree or post, will attract various species of birds, including pileated woodpeckers, yellow-bellied sapsuckers, flickers, and red-bellied and downy woodpeckers. Dough made from cornmeal, flour, bacon grease and peanut butter and other ingredients is a favorite of many birds. It can be placed in suet cages, wire cages made of hardware cloth, or stuffed into holes drilled into posts or dead trees.

WORTH THE EFFORT

Committed bird feeders such as Sandy and Garland view their efforts as more than simply a hobby, but rather a way to feel a real

MASLOWSKI WILDLIFE PRODUCTIONS

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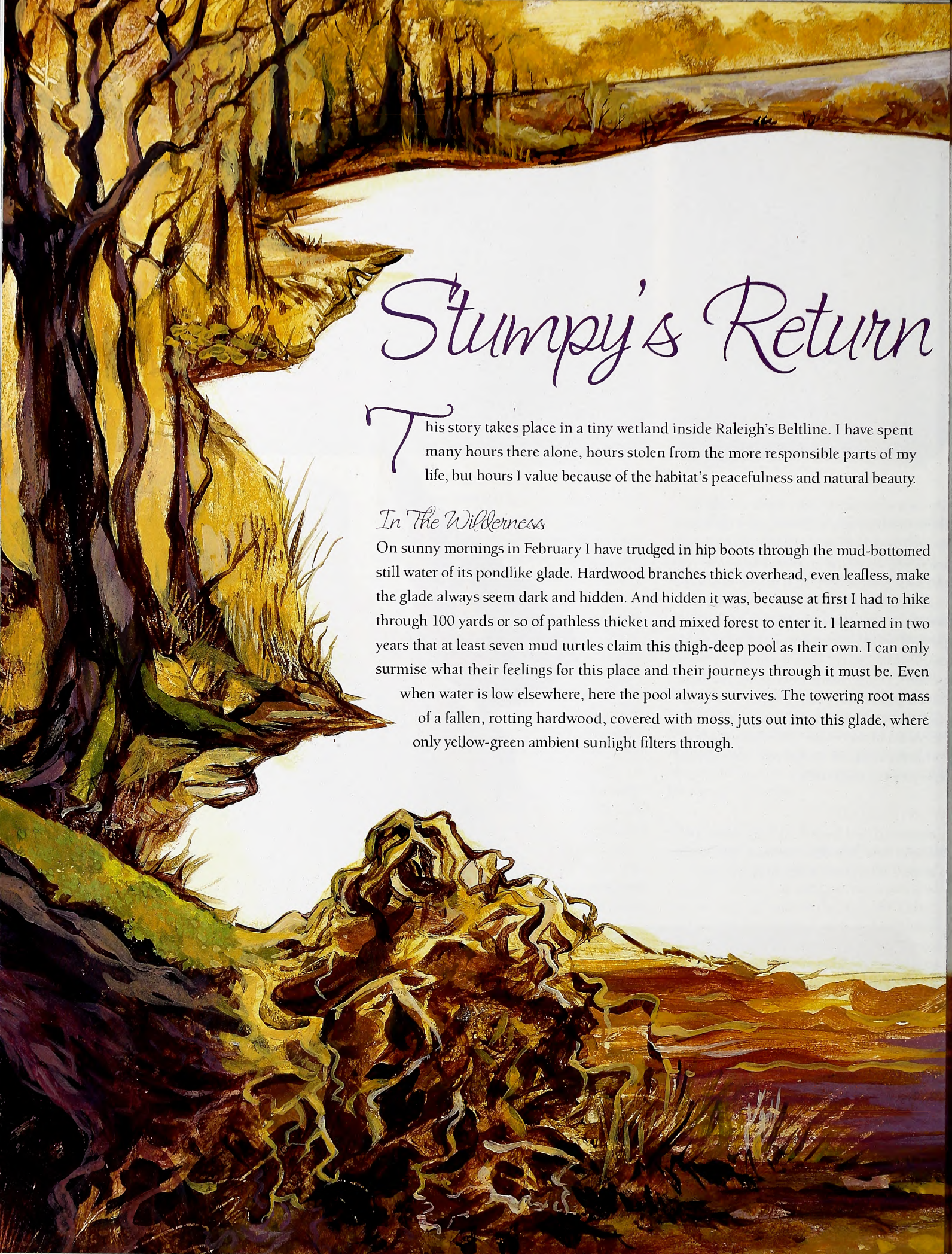
–Garland Pardue



Stumpy's Return

This story takes place in a tiny wetland inside Raleigh's Beltline. I have spent many hours there alone, hours stolen from the more responsible parts of my life, but hours I value because of the habitat's peacefulness and natural beauty.

In The Wilderness

On sunny mornings in February I have trudged in hip boots through the mud-bottomed still water of its pondlike glade. Hardwood branches thick overhead, even leafless, make the glade always seem dark and hidden. And hidden it was, because at first I had to hike through 100 yards or so of pathless thicket and mixed forest to enter it. I learned in two years that at least seven mud turtles claim this thigh-deep pool as their own. I can only surmise what their feelings for this place and their journeys through it must be. Even when water is low elsewhere, here the pool always survives. The towering root mass of a fallen, rotting hardwood, covered with moss, juts out into this glade, where only yellow-green ambient sunlight filters through.

The amazing journey of a relocated spotted turtle confounds a naturalist and brings up troubling questions about animals' attachment to a specific piece of habitat.

written by Bob Palmatier
illustrated by Karen Lee

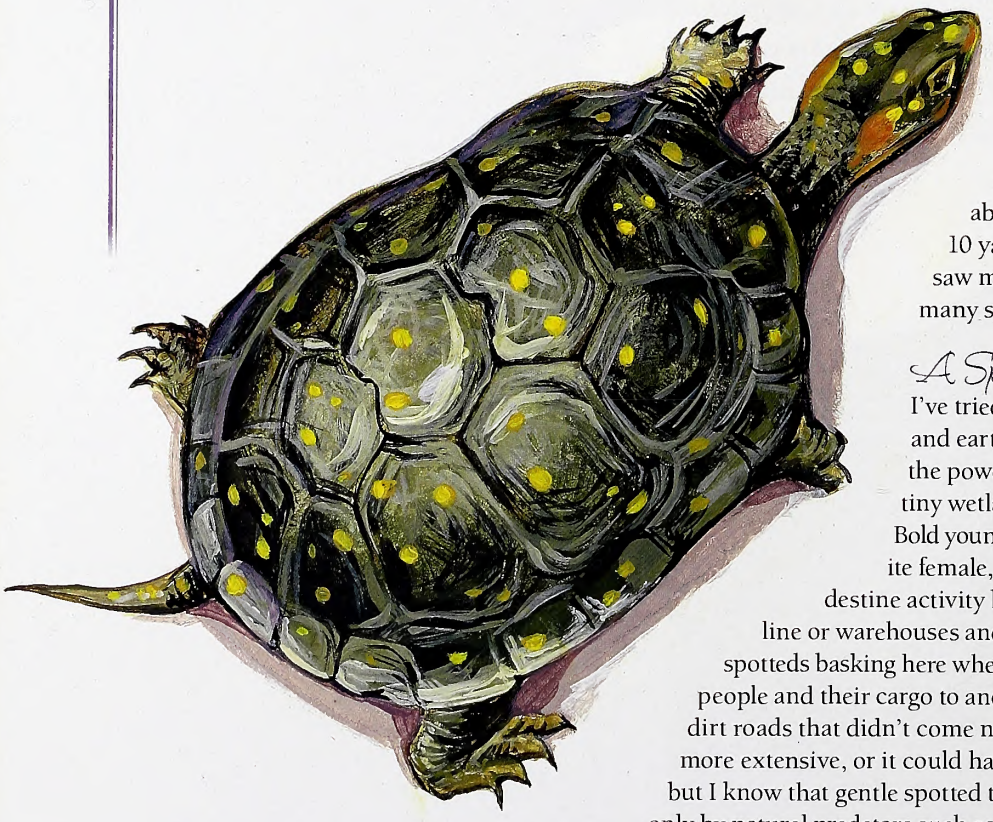
A muskrat passageway marks the target of my muddy trudge. Halfway through the pool, and hip deep, I remark to myself that if I fall, or if something else happens, I am very much alone here. About this time the water shallows, and I bend into the reed-lined muskrat passage that leads out past the final line of trees into the light of the power line clear-cut. The cut is only 10 or 12 yards from a railroad embankment that it parallels, but even in February the wild growth creates a labyrinth of hummocks, water passageways and dense masses of woody shrubs. Here, 15 yards to my right, and about 40 to my left, lies the goal of my 40-minute drive from home: a tiny habitat of amphiumas and spotted turtles.

A Hidden Treasure

As the weeks warm into March and May, where my boots now stand ankle deep, moist green arrowhead and pickerelweed will thrust their stems and leaves from waters shimmering with the subsurface movements of mosquito fish and tadpoles. In wild-growth thickets further up the clear-cut and on higher ground, bristling thistle flowers will riot in golden and lavender hues.

But now, in February's low but warming sun, my rendezvous lies with the dull, black, drying shells and bright salmon flecks on the necks of the year's first spotted turtle baskers. They never greet me in numbers here, but if I pace softly through water and past hummocks and let not even one dark branch or twig slap back noisily as I pass by, they permit me to glimpse them singly from a distance, pulled out of the chilled water on the end of a discarded and partly submerged railroad tie, or on the side of a grass hummock. They are responding to the ancient power of the sun that draws them up out of their cold, wet winter slumber.

Don't they know it's still winter? They challenge the axiom of ectothermicity, as do the spotted salamanders whose wild, groping midnight dance has left green-tinted translucent egg masses here and there in this tiny wetland that trickles along the shadow of the mountainlike railroad embankment. One afternoon as I crouched in the water, setting a trap in a tangle of shrub branches and river birch, a thundering diesel engine drew heavy freight cars slowly along the line above me. The engineer glanced down, his eyes not 10 yards from mine. I didn't wave. I don't know if he saw me. Even if he had, I imagine freight engineers see many stranger sights.



A Spared Sanctuary

I've tried to picture when this massive grade of gravel and earth was laid down, and the trees first removed for the power line cut on either side of the grade. Surely this tiny wetland was already here. It was just humanly altered. Bold young *Clemmys guttata* males battled over their favorite female, and eggs were laid. I can even imagine this clandestine activity being carried out here before Raleigh had a Beltline or warehouses and businesses to serve with a railroad. I can see spotteds basking here when only horse- or mule-drawn wagons transported people and their cargo to and from the center of North Carolina's capital on dirt roads that didn't come near this wetland. The habitat might have been more extensive, or it could have been as insignificant to humans as it is now, but I know that gentle spotted turtles basked here in vigilant peace, threatened only by natural predators such as raccoons. Often the shells of older individuals I

have come to know here show holes or long parallel grooves that look like the gnawings of some mammal's canine teeth.

Which brings me to the matter of Stumpy. I met Stumpy almost two years ago, the same day I was first shown this habitat by a fellow herper who has since left the area. This individual had been moving some of the spotted turtles out of the habitat to another, unconnected wetland a couple of miles away. Surveyors' tags had begun to pop up on tree trunks next to the glade, and he felt it in the turtles' best interest to move them to a location with better prospects. So at his house I met Stumpy. Met him and photographed him — carapace, plastron and profile. And when we had driven to the release site, I photographed his hesitant good-bye swim. Stumpy is a disabled turtle. His right foreleg is a well-healed, pointed stump. I reckoned a raccoon, or who knows what, had relieved him of his foot and foreclaws years ago. We let him go, watched him swim into the extensive pond area, and drove on to the original habitat. In doing so, I would later notice, we crossed a railroad track.

Inevitable Change

I've tried to remain true to the ethics of our science. I haven't stripped the tiny wetland of its spotted turtles. With great effort over two early springs, I trapped fewer than 15 *Clemmys* here, not enough to satisfy an entrepreneur. (I also discovered unintentionally that amphiumas have a keen taste for raw chicken legs.) Each turtle has been photographed, weighed, measured and released back into its habitat, with the exception of one male and one female I kept in captivity. But over two years, I saw my friend's fears justified. On the far side of the embankment, acres of thick woodland have been logged. On the near side, up to 15 yards of the entrance glade and more than 100 yards of deep woods and greenway have been logged, cleared and graded to make a golf driving range. A deep natural holding pond for runoff above the spotted habitat, inhabited by painted turtles and water lilies, has been sucked dry mechanically several times to create a decorative pond area near the head of the driving range.

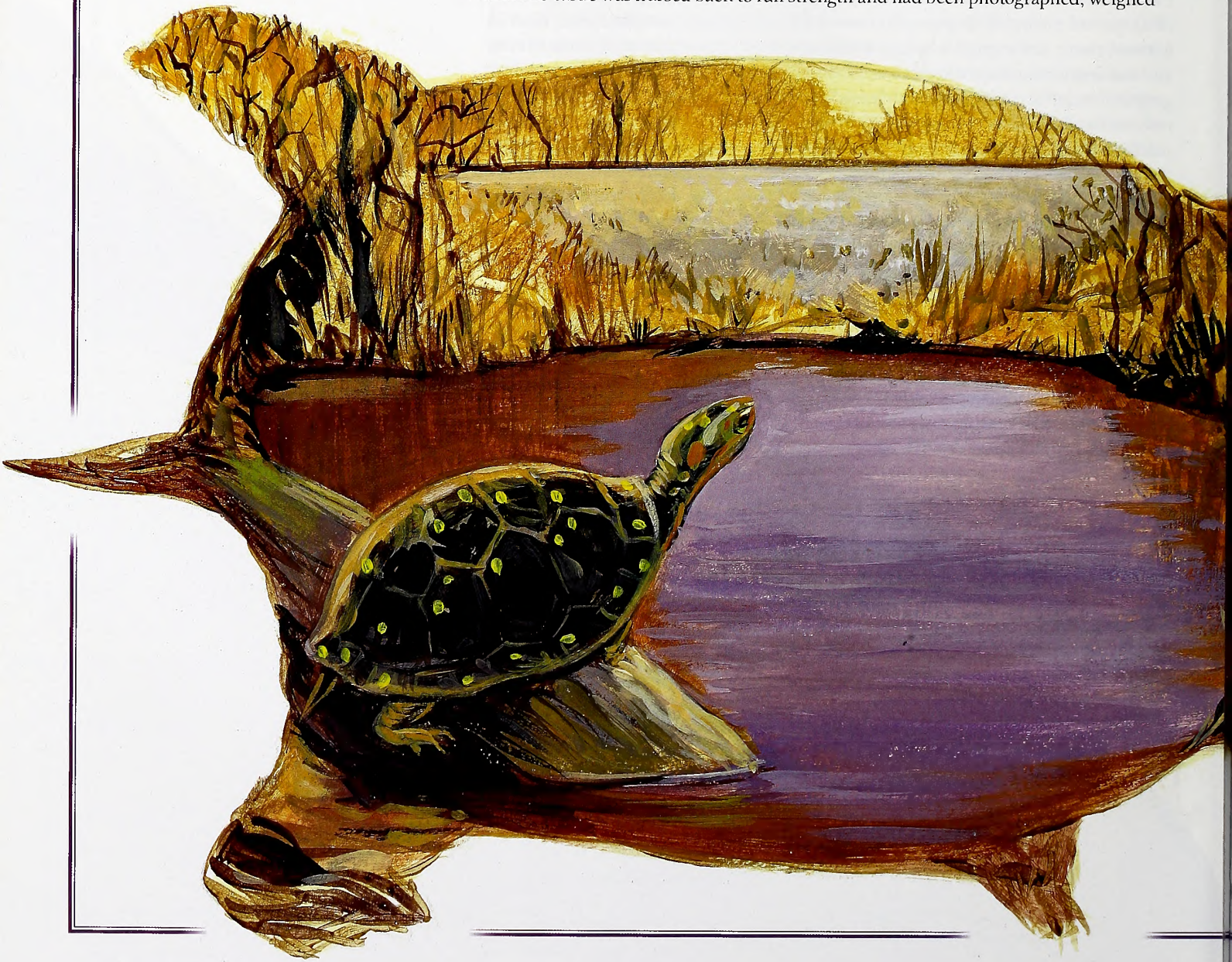
When I first saw these new developments, I wondered if I should transfer all the spotteds I could trap. Their prospects didn't look good. Maybe they would all be better off where Stumpy had been released. But then again, the power line cut and the railroad had probably saved the habitat from the same treatment. Maybe the habitat could survive.

Unintended Consequence

In late March, I made a hasty midweek trip from Durham to the habitat. I had put out a baited trap with 4 inches of breathing space above water, and the volume of rain falling had me badly worried about killing turtles instead of helping them. It was dark, the rain was cold, and my only motivation was conscience. This was not going to be a pleasure trip. When I reached the glade, my fears were realized. The water level had risen. When I finally scrambled through the muskrat passage into the spotted turtle area and located my trap, I could see that it was totally submerged. I prayed to find nothing at all inside. What I found, though, was a limp-limbed spotted turtle! I stuffed him into my pocket, tied my trap out of the water under a bush, and made my way back to my car.

In the car and driving home, I tried to warm up the turtle and press on his carapace and plastron to empty any water and encourage his breathing. I didn't know whether it was wishful thinking, but I thought I had perceived a tiny bit of movement when I pulled him out of the trap. In fact, after about 20 minutes of turtle resuscitation, he was showing weak but definite signs of life.

You may draw your own lessons from this story, but here's mine, for what it's worth: When this turtle was nursed back to full strength and had been photographed, weighed



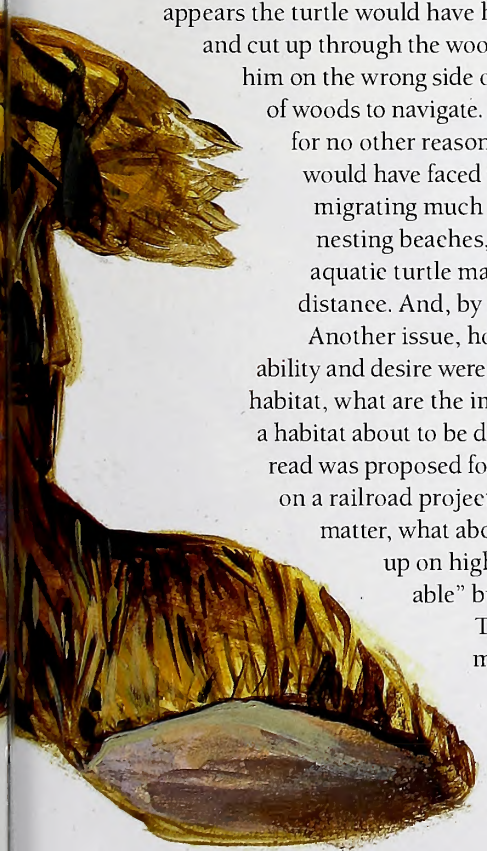
and measured, I released him back into his habitat. He deserved it, and as spotted turtles go, he seemed to hold no grudge against me or the herper who had shown me the habitat. All the more strange, because the turtle was Stumpy, 13 months later, back in his original habitat!

The carapace photographs were conclusive, yellow spot for yellow spot. The plastron pattern was a perfect match. The only difference I could discern between my first photographs and the subject himself was that he had an additional scraped spot on the anterior end of his plastron, as if he had skidded on a hard, abrasive surface for a moment or two. To me, it would have been a match even if he had regenerated a new foot.

Amazing Journey

All this got me thinking a lot. First, *how* did he do it? The release spot was a mile and a half or more distant, not connected in any sense by water, and on the opposite side of the railroad embankment. Starting from the spotted habitat and heading back toward the release point, I have walked a good bit of the distance, following the railroad track. A number of wide and deep runoff streams cut under the railroad line. They are bridged by the railroad. Each one flows perpendicular to the rail line. I didn't care to cross them, even with hip boots, and instead crossed on the railroad trestles. At this point, the logged portions across the embankment have stopped, so if that had been his return route, Stumpy would have had to negotiate thick woodland with numerous fallen-log obstacles and thick undergrowth. The habitat side of the embankment at this point is lined with fenced-in warehouse and business properties with gated sidings for the railroad.

I've also tried to start at the release end of Stumpy's journey. Where the wide pond ends toward the track side, both sides of the rail are flanked by fenced businesses. It appears the turtle would have had to follow his new pond toward his old habitat and cut up through the woods when the pond ended, but this would have put him on the wrong side of the railroad embankment with a mile and a half of woods to navigate. I've wanted to photograph the area from the air, if for no other reason than to annotate further for myself the odds he would have faced in finding his way back. We're used to sea turtles migrating much farther through clear ocean lanes to find their nesting beaches, but this is the first time I have heard of a small aquatic turtle making an unaided return over such a significant distance. And, by the by, what was he using as a homing device?



Another issue, however, bothers me more. If Stumpy's instinctive ability and desire were strong enough to mandate his return to his natal habitat, what are the implications for relocating entire populations from a habitat about to be developed to another "suitable" wetland — as I've read was proposed for one *Clemmys guttata* population "encroaching" on a railroad project in Massachusetts several years ago? Or, for that matter, what about the thousands of "pet" turtles who are picked up on highways and replaced months or years later in "suitable" but different habitat areas?

This anecdotal experience may not amount to much more than a curious tale to tell around the campfire, but I think it might say a lot about conserving certain crucial habitats intact as the wheels of human progress crunch on. ◆

Bob Palmatier has written a children's book based on this story. To learn more about this and other projects, visit www.bobpalmatier.com for details.

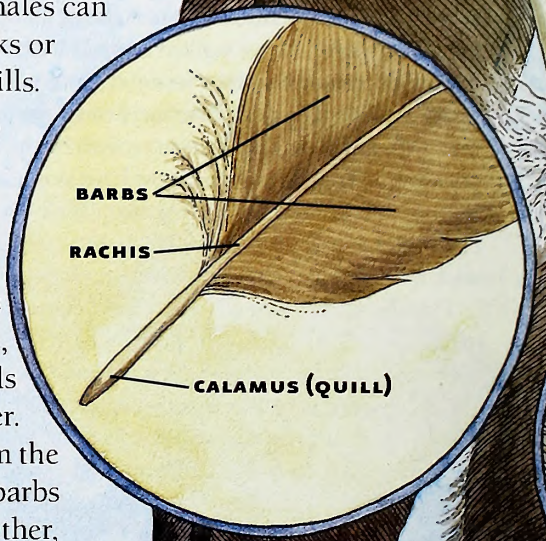
Fabulous Feathers

written and illustrated by Consie Powell / nature activity by Anne M. Runyon

Everyone knows what makes a bird a bird, right? Birds can fly. But bats and insects fly, too. Unlike bats and bugs, birds have scaly legs. But lizards and turtles have scaly legs, too. Unlike lizards and turtles, birds can sing. But frogs and whales can sing, too. Unlike frogs and whales, birds have beaks or bills. But squids have beaks, and platypuses have bills. What makes a bird a bird is its covering of feathers.

EACH AND EVERY FEATHER

Every feather has two main parts, the shaft and the barbs. The shaft is the stiff center of the feather. It is made up of the hollow calamus, or quill, which is embedded in the skin and attached to muscle, and the solid rachis (RAY-kiss), which holds the barbs that make up the rest of the feather. The barbs are branches which grow out from the shaft. Depending on the type of feather, the barbs may have barbules which hold the barbs together, or may be random and soft. The flat surface of interlocked barbs is called the vane.



HOW DO FEATHERS GROW?

Feathers are made from the protein keratin, the same material that produces hair and claws. A feather starts its growth as pulp inside a cylindrical feather sheath which grows from follicles (tiny pits) in the skin. The feather tip first emerges from the sheath as a tuft. As the sheath grows, the feather unrolls and splits to form a flat blade. Once a feather is fully grown, the sheath falls away and the nourishing blood supply is cut off.

Like hair, feathers are not living tissue.

Tail feathers in the center of the tail have symmetrical vanes, while those at the edges may be asymmetrical.

Inner wing feathers are usually oblong and fairly symmetrical.

Outer wing feathers are long, and usually have one vane distinctly wider than the other.

Contour feathers are short and round, with barbs of equal length on each side of the shaft.

MOURNING DOVE

WHAT DO FEATHERS DO?

Different feathers have different jobs on a bird's body. Down feathers have basically no shaft, and have soft, finely divided barbs that grow from a common point. They trap air close to the skin to insulate the bird.

Body feathers include contour feathers that streamline the body, and wing feathers that guide air flow over the wing and provide strength and power for flight. These feathers come in many sizes and shapes. Contour feathers are short and round, while inner wing feathers are usually oblong, and both usually have some down near the quill. Outer wing feathers are the strongest feathers on a bird's body, with a long shape and size to provide power for flight.

Tail feathers are used for steering during flight, and for balance when perching or on the ground. They also may be displayed to impress a prospective mate or a rival.

CANADA GOOSE

RUBY-THROATED HUMMINGBIRD

FEATHERS FALL OUT

Feathers can't, and don't, last forever. Regular wear and tear takes its toll. Once a year, at least, and for many birds, twice a year, old feathers are dropped and new ones grow. This process of molting uses a lot of energy, so it usually occurs at times when food is readily available, and other energy demands are low. During the molt, feathers are shed, then replaced, in a predictable and orderly way.

Sometimes a feather is injured or accidentally lost. In this case, a replacement feather starts growing right away, not waiting for the regular time of molt.

FEATHER COLOR, FEATHER PATTERN

Feathers come in all kinds of colors, and may be patterned with stripes or spots, squiggles or blotches. The color itself is caused by pigments in the feather (chemical compounds that absorb or reflect light in specific ways), by structural characteristics of the feather, or by a combination of these.

Feather color has various functions. Dark feathers can help a bird that lives in a cold climate absorb heat from the sun, while light feathers help desert birds reflect the sun's heat. Feathers can camouflage a bird. Woodcocks and bitterns have patterning that mimics their habitat. Killdeer sport a disruptive pattern that makes them hard to see, even out in the open. Many birds are bright and gaudy; these colors stand out and attract mates or notify other birds of the wearer's territory.

NORTHERN FLICKER

CROW

TURKEY

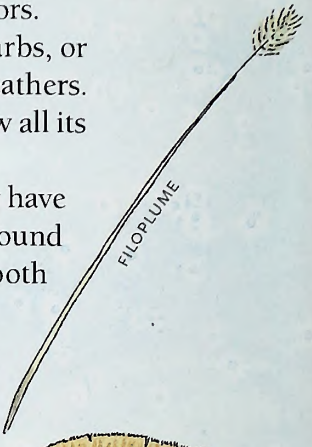
Some birds, such as many waterfowl, molt all their flight feathers at once. This means there is a period of about two weeks, the time it takes for new feathers to grow, that they are flightless.

FEATHERS OF ALL SORTS

Natal down is a soft, fluffy coat of feathers present on some birds, such as ducklings and owlets, at hatching. This natal down is a distinct and separate feather formation from adult down feathers and is lost as body feathers grow in.

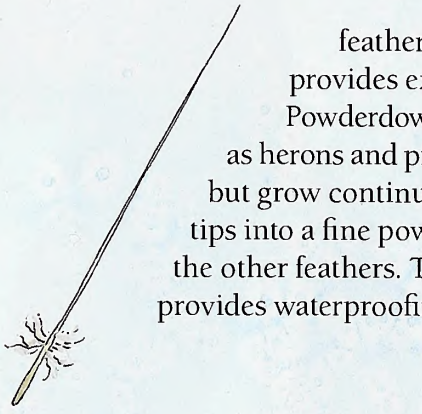
Bristles are small contour feathers that lack barbs on their outer parts and have an especially stiff rachis. They are often found around the beaks of many insect-eating birds and probably provide protection to eyes, as well as serving as touch sensors.

Filoplumes are the simplest feathers. They consist of a rachis with no barbs, or only a few at the tip. They are stiff and hairlike, and lie under contour feathers. Sensory receptors next to the base of these feathers help a bird to feel how all its feathers are lying.



Semiplumes are a cross between down and contour feathers. They have barbs and rachis, but no hooks to hold the barbs together. They are found between other feathers, giving extra insulation and adding to the smooth shape of a bird.

Afterfeathers are attached to the lower shafts of some contour feathers. Like the main feather, only smaller, this additional feather provides extra insulation.



Powderdown feathers occur in certain groups of birds such as herons and pigeons. These feathers are never molted, but grow continuously. They disintegrate at the tips into a fine powder, which then permeates the other feathers. This powder probably provides waterproofing.

Get Outside

Collect feathers: Birds shed their feathers, and if you keep your eyes open, you just might find some of them. Parks where ducks and geese hang out usually have feathers scattered here and there on the ground. Take a close look at the feathers you find. Can you figure out what kind of feathers they are? Use a magnifying glass or hand lens, and take a super-close look at the barbs and barbules. Pull the barbs apart a bit, then smooth them back together to see how efficiently they work.

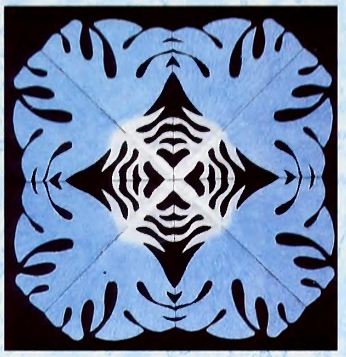
Look for other places that feathers show up. Here are some clues: Think about hats and headdresses. Think about a bottle of ink and sheets of paper. Think about what's under your head when you sleep. Think about a warm, puffy jacket. Think about fishing. Can you figure out how feathers are used in these situations? Can you figure out other uses for feathers?

Read and Find Out

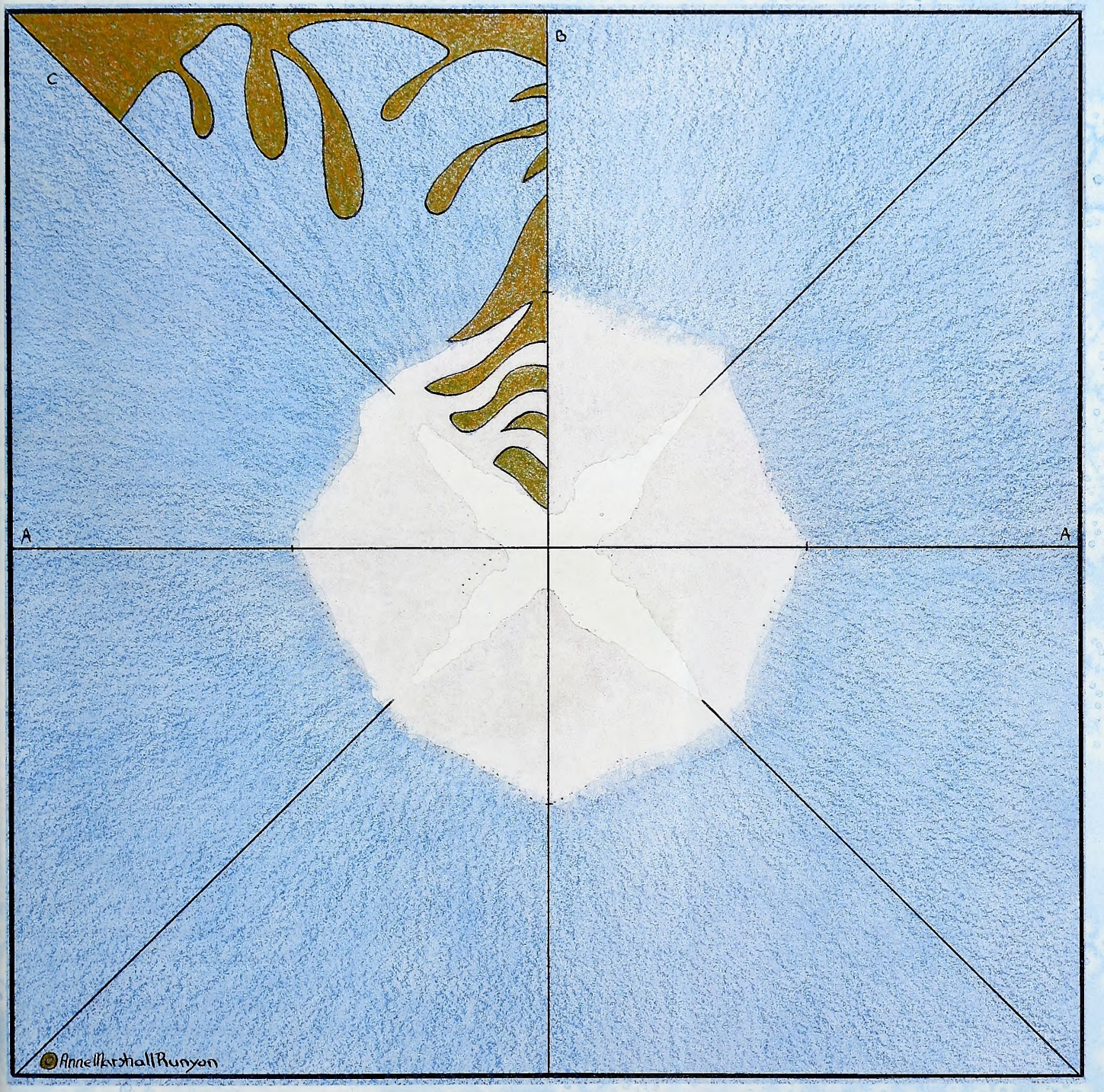
- "Bird" by David Burnie, Dorling Kindersley, 1988.
- "Peacocks, Penguins & Other Birds" by Steve Parker, Compass Point Books, 2006.
- "Birds: Nature's Magnificent Flying Machines" by Caroline Arnold, Charlesbridge, 2003.
- "The Sibley Guide to Birds" by David Allen Sibley, Alfred A. Knopf, 2000.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Four Feathers: A Contour Feather Cut-out



1) Cut out box.
2) Fold down along line A, making a rectangle.
3) Fold down along line B, making a square.
4) Fold down along line C, making a triangle.
5) Following the black lines, cut away the orange areas.
6) Unfold your Four Feather Design.



This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Count Your Backyard Birds

Bird and nature fans throughout North America may join tens of thousands of everyday bird watchers for the 12th annual Great Backyard Bird Count (GBBC), Feb. 13–16.

A joint project of the Cornell Lab of Ornithology and the National Audubon Society, this free event is an opportunity for families, students and people of all ages to discover the wonders of nature in back yards, schoolyards and local parks, and, at the same time, make an important contribution to conservation. Participants count birds and report their sightings online at www.birdcount.org.

"The Great Backyard Bird Count benefits both birds and people," said Audubon Education Vice President, Judy Braus. "It's a great example of citizen science: Anyone who can identify even a few species can contribute to the body of knowledge that is used to inform conservation efforts to protect birds and biodiversity. Families, teachers, children and all those who take part in GBBC get a chance to improve their observation skills, enjoy nature and have a great time."

Anyone can take part, from novice bird watchers to experts, by counting birds for as little as 15 minutes (or as long as they wish) on one or more days of the event and reporting their sightings online at www.birdcount.org. Participants can also explore what birds others are finding in their backyards—whether in their own neighborhood or thousands of miles away. Additional online resources include tips to help identify birds, a photo gallery, and special materials for educators.

The data these citizen scientists collect helps researchers understand bird population trends, information that is critical for effective conservation. Their efforts enable everyone to see what would otherwise be impossible: a comprehensive picture of where birds are in late winter and how their numbers and distribution compare with previous years. In 2008, participants submitted more than 85,000 checklists.

KEN TAYLOR / NCWRC

"The GBBC has become a vital link in the arsenal of continent-wide bird-monitoring projects," said Cornell Lab of Ornithology director John Fitzpatrick. "With more than a decade of data now in hand, the GBBC has documented the fine-grained details of late-winter bird distributions better than any project in history, including some truly striking changes just over the past decade."

Each year, in addition to entering their tallies, participants submit thousands of digital images for the GBBC photo contest. Many are featured in the popular online gallery. Participants in the 2009 count are also invited to upload their bird videos to YouTube; some will also be featured on the GBBC web site. Visit www.birdcount.org to learn more.

Businesses, schools, nature clubs, Scout troops and other community organizations interested in the GBBC can contact the Cornell Lab of Ornithology at 1-800-843-2473, or Audubon at citizenscience@audubon.org or (215) 355-9588, ext. 16.

F. EUGENE HESTER

MASLOWSKI WILDLIFE PRODUCTIONS

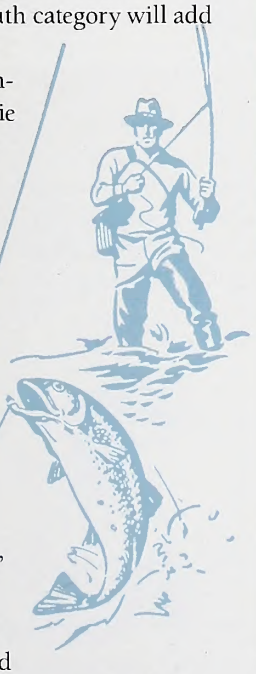
Pisgah Fly Masters Field Includes Young Anglers

The Pisgah Fly Masters fly-fishing tournament on the Davidson River is back for a second year, on March 21–22, and will add a youth category this year for anglers under 16 years of age.

Hosted by the Pisgah Center for Wildlife Education and Davidson River Outfitters, the competition tests anglers' casting skills off-stream, and catch and release abilities on-stream. Registration is open to the first 125 entrants through March 3 for $50, with a late registration available for $75 until March 21, depending upon space remaining.

All proceeds will go toward building a new classroom at the Pisgah Center for Wildlife Education, the N.C. Wildlife Resources Commission learning facility. The classroom will be used for educational programs, including instruction on fly-fishing and fly-tying.

"Including a youth category will add another needed dimension to the competition," said Emilie Johnson with the Pisgah Center for Wildlife Education and a tournament organizer. "I think we will see a bigger response because of it, and I expect more family participation, with moms, dads, sons and daughters entering the event."



The Pisgah Center for Wildlife Education is located near Brevard, adjacent to the Bobby N. Setzer State Fish Hatchery. Aquatic ecosystems and cold water conservation are a large part of the exhibits and displays.

For the competition format, rules, prize list and entry forms, contact the Pisgah Center for Wildlife Education at (828) 877-4423 or e-mail emilie.johnson@ncwildlife.org.

Items That Changed Fishing

At the 75th ICAST Show in Las Vegas, several thousand avid anglers were asked to list the items they felt were most instrumental in shaping the sport of fishing since the origin of the show. The American Sportfishing Association compiled the results. Here are the top choices:

Original Floater Minnow (1936):
This remains one of the most successful and widely copied hard lures in sport fishing history. The original and current manufacturer is Rapala.

Spring-Loaded Bobber (1947):
This made suspending a baited hook at a desired depth simpler and easier. First manufacturer was Nibble Nabber.

Mitchell 300 (1949):
The first commercially successful spinning reel, still popular today.

Creme Plastic Worm (1949):
The artificial worm that looked and felt real, and started the soft plastic bait trend that changed fishing forever.

Closed-Face Spincast Reel (1949):
Made fishing easy and affordable, especially for kids and casual anglers. Brought out by Zero Hour Bomb Co., better known as Zebco.

Lowrance Fish Lo-K-Tor (1957):
The "Little Green Box" that used sonar to locate fish and structure, and measure the water depth.

Monofilament Line (1958):
Improved the durability, affordability and casting ability of fishing line while reducing its visibility to fish. DuPont Stren was the original manufacturer.

Minn Kota Trolling Motor (1958):
First electric gear-driven trolling motor that gave anglers the ability to quickly and quietly maneuver their boat.

Mitchell 300 (1949) JIM DEAN

Fenwick High Modulus Graphite Rod (1972):
Revolutionized the making of fishing rods with super-sensitive carbon (graphite) fibers.

Shakespeare Ugly Stick (1976):
Special construction that created an affordable, unbreakable fishing rod that remains popular today.

Shooting Range Expands

The N.C. Wildlife Resources Commission has expanded the shooting range at the John Lentz Hunter Education Center at Millstone 4-H Camp in Richmond County, adding 100- and 50-yard ranges to the popular site for hunters and other sportsmen. New shelters with wooden roofs and cement floors protect shooters from the weather.

"This expansion reflects our commitment to the commission's Hunting Heritage Program Strategic Plan, which includes key focus areas intended to increase opportunities for hunters by reducing barriers to participation," said Gordon Myers, executive director of the commission.

In addition to year-round shooting opportunities, the John Lentz Hunter Education Center provides unique programming opportunities such as the Fur, Fish 'n Game Rendezvous, a five-day, six-night camp that draws young people from across the state to learn about and participate in a wide range of conservation-related activities.

The range includes two combination trap and skeet fields, along with a conventional archery range and 3-D archery range. The site has a five-stand range, a small-bore rifle range and a classroom that can accommodate up to 50 people. For safety, all ranges are surrounded by earthen berms with controlled access.

The Lentz range is open to the public from 1 to 5 p.m. on Wednesday and Friday through Sunday, and also by appointment. For more information on the Lentz Hunter Education Complex, go to www.millstone4hcamp.org. For information on other ranges, visit www.ncwildlife.org, and click on "Public and Private Shooting Opportunities in North Carolina."

Five Species Added to Recognition Program

Bragging rights are as much a part of fishing as casting a line. Since July 1, 1997, anglers who catch trophy-size fish that do not qualify for a state record can have their fishing feats officially recognized by the N.C. Wildlife Resources Commission through its North Carolina Angler Recognition Program (NCARP).

To encourage more participation in the program, the commission recently added five new fish for a total of 37 freshwater fish species that are recognized through the NCARP. The additions, and their minimum weight and length requirements, are:

BULLHEAD CATFISH (BLACK, BROWN OR YELLOW BULLHEADS)
2 POUNDS OR 15 INCHES IN LENGTH
KOKANEE SALMON — 2 POUNDS OR 14 INCHES IN LENGTH
REDFIN PICKEREL — 10 OUNCES OR 12 INCHES IN LENGTH
FRESHWATER DRUM — 12 POUNDS OR 28 INCHES IN LENGTH
PUMPKINSEED — 14 OUNCES OR 10 INCHES IN LENGTH

PUMPKINSEED

FRESHWATER DRUM

ILLUSTRATIONS BY DUANE RAVER

Anglers who catch a fish that meets or exceeds either the weight or length requirement can submit their catch information to the commission's Division of Inland Fisheries in exchange for a certificate of recognition that features a color reproduction of the fish species by renowned wildlife artist Duane Raver. Anglers who collect six NCARP certificates will receive a "Master Angler" certificate and patch.

In addition to recognizing anglers who catch trophy fish, the program provides fisheries biologists with information that can be used to help determine the angling quality of specific bodies of water.

"Angler catch data are used in conjunction with sampling to evaluate fisheries," said Kent Nelson, fisheries program manager with the Division of Inland Fisheries. "Division staff utilizes these data to develop a list of fishing 'hot spots' and to advise anglers where quality-sized fishes of various species are being caught. In addition, data generated can be used to assess changes in the angling quality of North Carolina waters over time."

To apply for an NCARP certificate, anglers should submit a completed NCARP application, which can be downloaded at www.ncwildlife.org. Applications are also available at most bait and tackle shops, sporting good stores and other Wildlife Service Agent locations, and in the *North Carolina Inland Fishing, Hunting, & Trapping Regulations Digest*. Anglers must pay a $5 fee with each application to cover costs associated with the program.

CALENDAR OF EVENTS

Saturday–Sunday, February 6–8

Check out the new 2009 N.C. Duck Stamp print at the 14th annual East Carolina Wildlife Arts and Decoy Carving Festival in Washington. Approximately 100 exhibitors will be on hand. The festival also features calling and carving competitions and retriever demonstrations.
Visit www.eastcarolinawildfowlguild.com.

Saturday, February 7

Learn about wintering waterfowl at Mackay Island National Wildlife Refuge with staff from the Outer Banks Center for Wildlife Education. Tour lasts five hours and is limited to those ages 14 and older. Call (252) 453-0221, ext. 3.
Visit www.ncwildlife.org.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

IN SEASON

This month, these seasons are open in North Carolina:

Bobcat: Through Feb. 28.

Common Snipe: Through Feb. 28.

Crow: Wednesday, Friday and Saturday of each week through Feb. 28.

Fox: See *Regulations Digest* for dates and locations.

Pheasant: Through Feb. 1 (male only).

Quail: Through Feb. 28.

Rabbit: Through Feb. 28.

Raccoon and Opossum: Through Feb. 28.

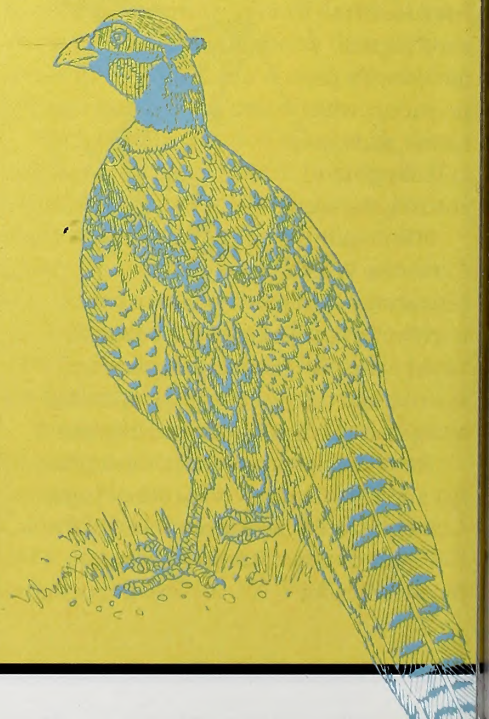
Ruffed Grouse: Through Feb. 28.

White-tailed Deer: Urban bow and arrow season through Feb. 14.

Migratory Waterfowl
Snow, Blue and Ross' Geese: Through Feb. 28.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2008–2009 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

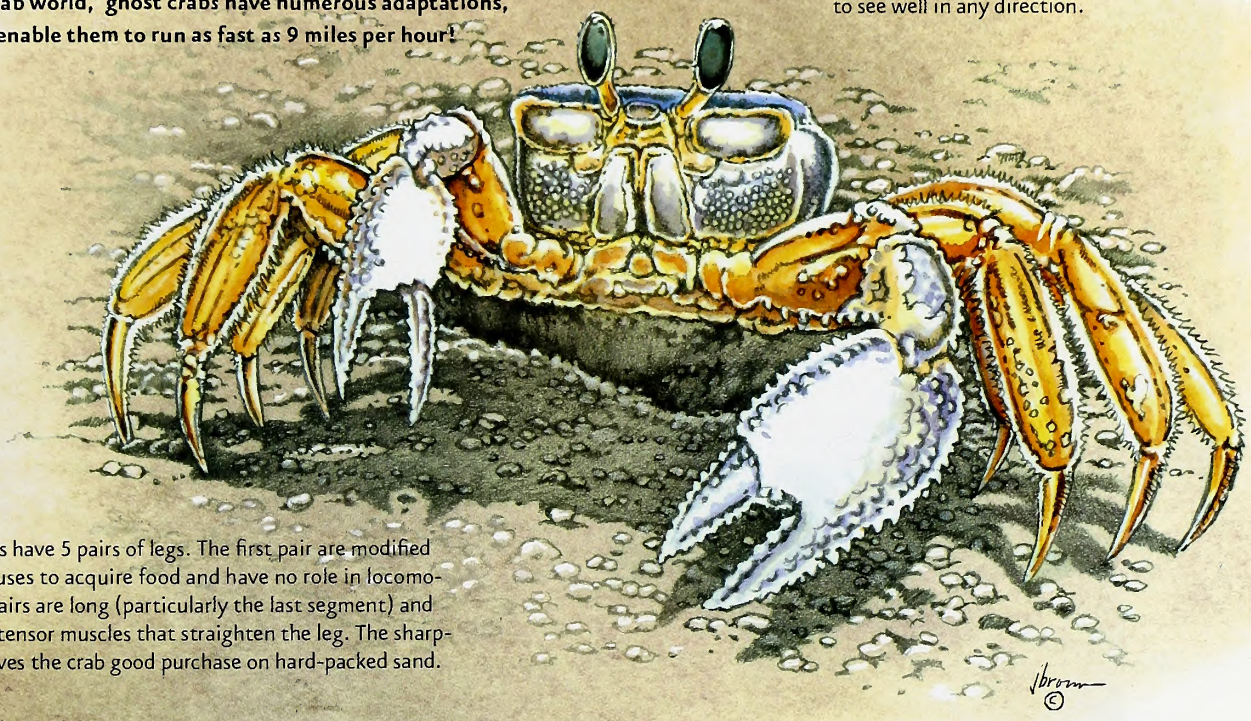


How Do Ghost Crabs Run So Fast?

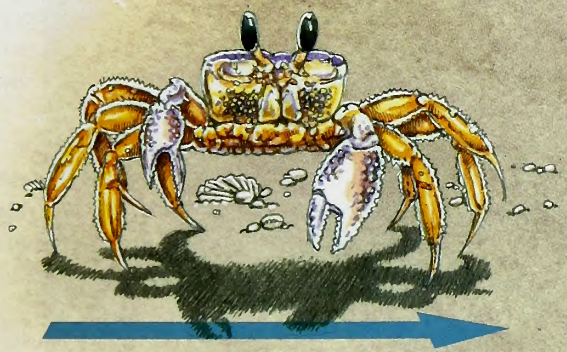
written by Clyde Sorenson
illustrated by Jim Brown

GHOST CRABS ZIPPING AROUND on the beach like steroid-enhanced wind-up toys are a familiar, and entertaining, sight on North Carolina beaches. The "greyhounds of the crab world," ghost crabs have numerous adaptations, and few neat tricks, that enable them to run as fast as 9 miles per hour!

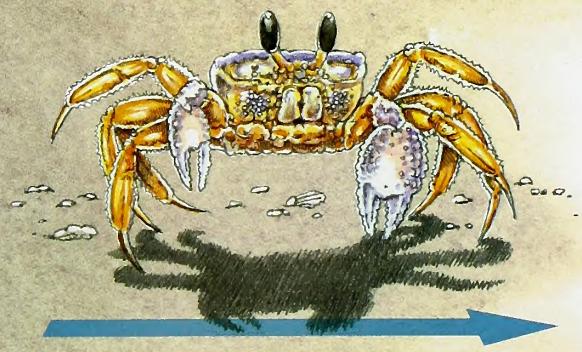
A ghost crab has a compact body with a lightweight exoskeleton compared to others such as blue crabs. The long eye-stalks allow it to see well in any direction.



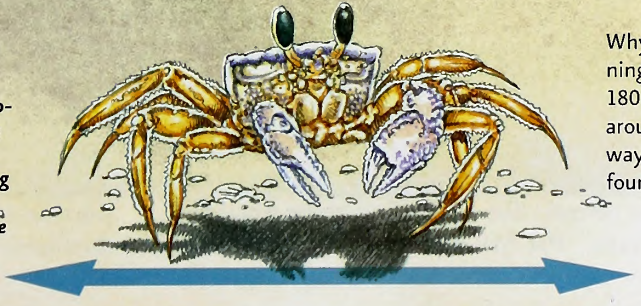
Like most crabs, ghost crabs have 5 pairs of legs. The first pair are modified into the crushing claws it uses to acquire food and have no role in locomotion. The remaining four pairs are long (particularly the last segment) and equipped with powerful extensor muscles that straighten the leg. The sharp-pointed tip of these legs gives the crab good purchase on hard-packed sand.



A walking crab uses all eight "locomotion" legs to move sideways.



A crab in a bit more of a hurry lifts its hindmost pair of legs and "trots" on the remaining six.



A crab in a real hurry lifts both the last and second-to-last pairs of legs and runs on the remaining four legs in a manner not unlike a horse. Most of the propulsion comes from the two legs pushing from the trailing side. In extreme acceleration, the crab may actually "pop a wheelie" on those two trailing legs and become momentarily bipedal!

Why run sideways? Sideways running allows crabs to change direction 180 degrees without having to turn around and to run just as fast either way, since the same equipment is found on both sides.

Down-Time Reading

written by Jim Dean

JIM DEAN

With all due respect to author John Steinbeck, early February finds us belly deep in another "winter of discontent." Most of the hunting seasons are over, and it will be weeks before we have any hope of intercepting hickory shad ascending our coastal rivers to spawn.

Traditionally, we fill this bleak period with such tasks as cleaning guns, repairing tackle, tying flies and painting decoys (148 last winter). A few lucky folks travel to warmer climates, but with the economic situation so dicey, that option is more likely limited to watching Corona commercials and whimpering softly. If we had a follicle on our posterior, we'd embark on a regimen of physical improvement, but most of us put on our fleece-lined slippers and bunny suits, and drift in and out of naps in front of the TV.

This is, however, a great time to bury yourself in a book. The personal favorites I recommend are mostly older classics with an outdoor flavor, but even if some were school assignments years ago, they are worth re-reading.

"Most of us put on our fleece-lined slippers and bunny suits, and drift in and out of naps in front of the TV."

A good place to start would be with Robert Ruark's "The Old Man and the Boy" and "The Old Man's Boy Grows Older." Ruark was a native of Wilmington, and these books were gleaned from his columns in *Field & Stream*. Ruark's portrayal of his childhood hunting and fishing with his grandfather is delicious. You may also like "Horn of the Hunter," his book on big game hunting in Africa. If so, you should also read Ernest Hemingway's short stories "The Snows of Kilimanjaro" and "The Short, Happy Life of Francis Macomber." Another Hemingway favorite is his classic trout fishing story "Big Two-Hearted River," but you could do worse than read everything he wrote.

Havilah Babcock was head of the English department at the University of South Carolina when he wrote a series of hilarious books, mostly about hunting bobwhite quail. Try "My Health is Better in November," or "I Don't Want to Shoot an Elephant."

Michigan Judge John Voelker wrote two wonderfully readable trout fishing books—"Trout Madness" and "Trout Magic"—under the pen name Robert Traver. Old-timers may recall that he also wrote the best seller "Anatomy of a Murder."

Perhaps it reflects my own taste, but virtually all the classic fishing books have trout fishing themes. Here are several I like—"The Seasonable Angler" by Nick Lyons, "The Well-Tempered Angler" by Arnold Gingrich (he was editor of *Esquire* magazine) and "The Spawning Run" by William Humphrey. Humphrey's short book first appeared in *Esquire* as "The Sex Life of a Salmon is Swift and Terrible." Be forewarned that not all the spawning involves fish.

Although it may not appeal to everyone, Richard Brautigan's "Trout Fishing in America" is an eclectic, likely drug-enhanced, yet often strangely moving view of this sport. For a more traditional treatment, read Ray Bergman's "Trout." You'll learn how much, and how little, the sport has changed since 1938.

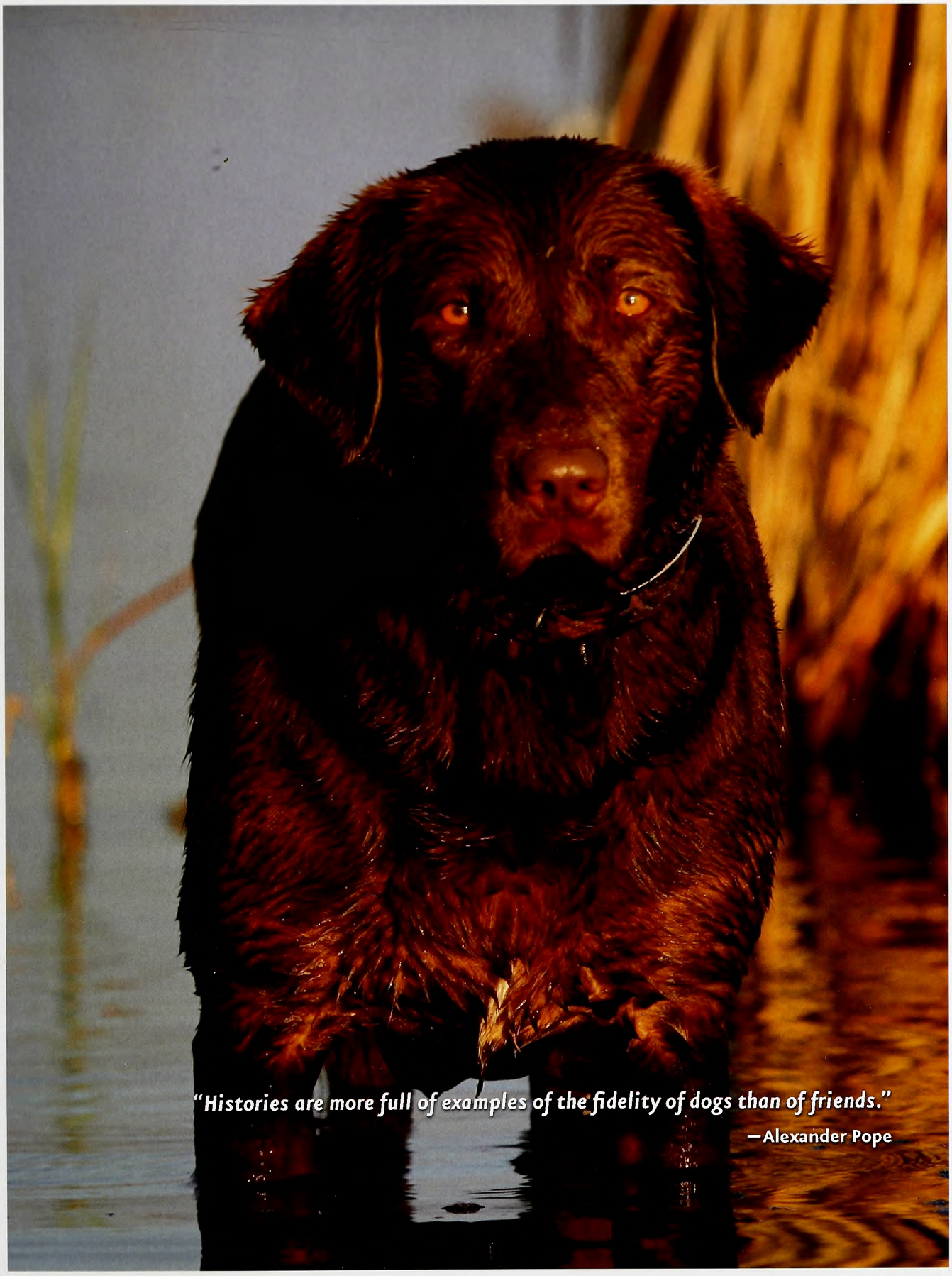
Venturing beyond pure hunting and fishing themes, you would almost surely enjoy Aldo Leopold's "A Sand County Almanac." Leopold is regarded as the father of modern wildlife management, and this highly readable and personal classic was far ahead of its time in charting a modern conservation ethic. Horace Kephart, a St. Louis librarian who moved to the Great Smokies before it became a national park, wrote about this vast wilderness and its people in "Our Southern Highlanders." It's all riveting stuff, especially the bear-hunting tales. His massive follow-up, "Camping and Woodcraft" is like a Boy Scout manual on steroids.

Surely no one thinks of William Faulkner as an outdoor writer, but he certainly knew how to tell a hunting tale. Read his novelette "The Bear" or short story "The Old People." If you aren't already a fan, you may be enticed to read more from the author many still regard as this nation's finest.

Other suggestions range farther afield into history and exploration. For a fascinating account of the Lewis and Clark expedition, read "Undaunted Courage" by Stephen Ambrose. Joshua Slocum's "Sailing Alone Around the World" is a must for any sailor, even the couch potato variety. For fictional bookends to Ambrose, get hold of A. B. Guthrie's "The Big Sky" and "The Way West." I also suggest you treat yourself to Mark Twain's "Life on the Mississippi," "The Innocents Abroad" and "Roughing It." You'll be laughing all the way.

Finally, here's a modern author to consider. Patrick O'Brian's 20-volume series of historical novels about the British Navy during the Napoleonic wars is really one long, beautifully written story with irresistible characters. Don't give up the ship until you've read at least 200 pages of the first one, "Master and Commander."

Some of these books are out of print, but if you don't find them in a library or bookstore, look for them under the author's name online, including Amazon.com. O'Brian alone will carry you happily through several Februaries.



KEITH LEFLER

Chocolate lab, Pamlico County

OUTDOOR MOMENT

IN THE MARCH ISSUE

KEN TAYLOR/NCWRC

BROAD-RANGING BEAUTY

The redbreast sunfish is a fierce fighter that can be caught in streams all across the state.

WILD AND SICK

Biologists now understand that it is crucial to prevent the spread of wildlife diseases.

FISHING WISHING

Back when girls didn't fish or hunt, she learned to love the sporting life through her father's tales.

Wildlife

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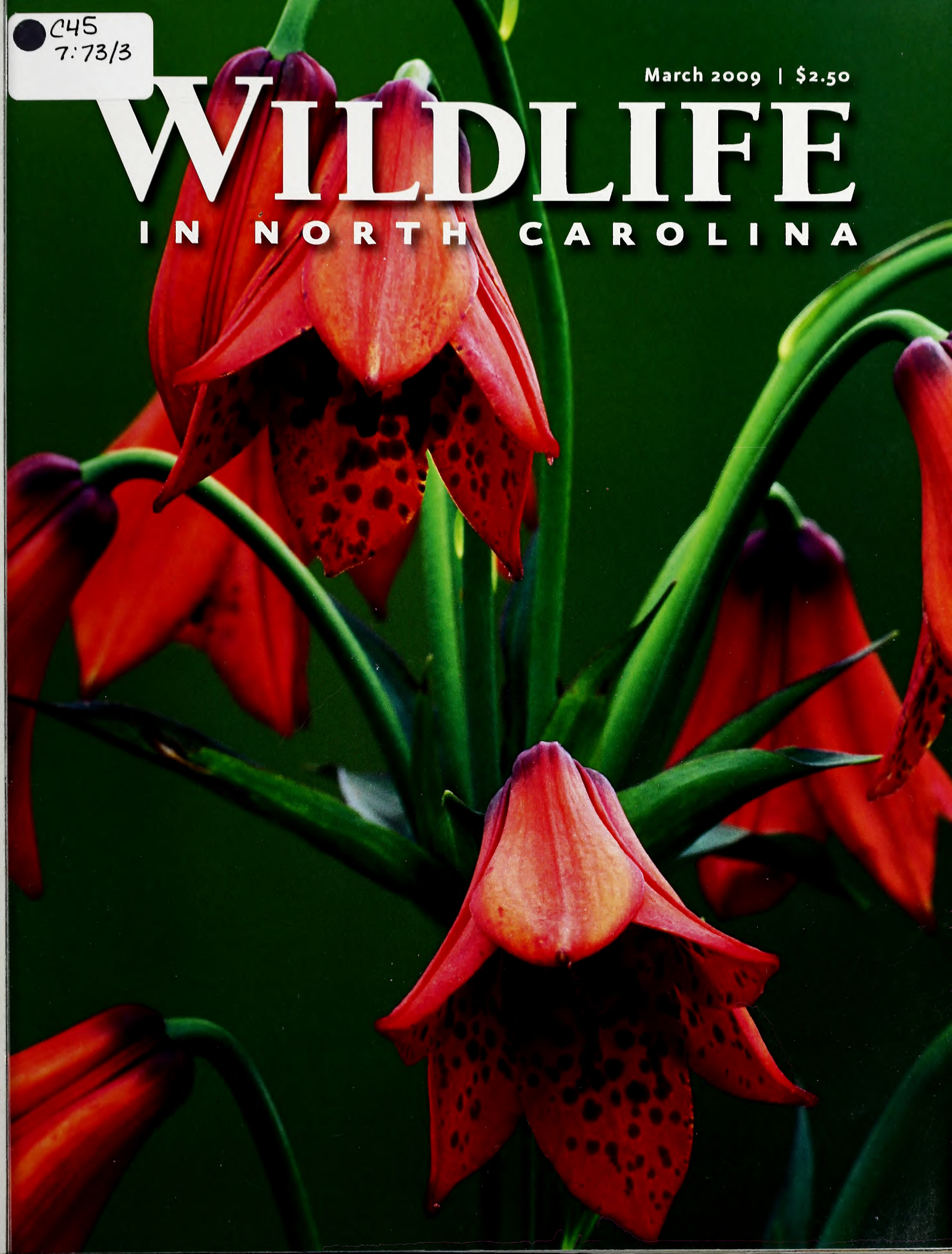
WILDLIFE IN NORTH CAROLINA



Although it is a fish in decline in coastal rivers, the alewife becomes a problematic invasive species when improperly introduced into inland waters.

PHOTOGRAPH BY ERIC ENGBRETSON.

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In an era when hunting and fishing were the provinces of men, one girl learned to love the traditions of the field sports from her father's stories.

14 **THE MOVING-WATER SUNFISH**
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Inhabiting fast-moving water and possessing a voracious appetite, the redbreast sunfish makes for an appealing angling opportunity.

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written by Sidney Cruze
Although our state is home to an impressive array of rare flowering plants, the numbers of these fascinating species are dwindling.

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written by Eric G. Bolen
Now that research has shown how epidemics spread within populations of wild animals, wildlife managers are taking proactive steps to stop these diseases.

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Cover: Gray's lily is one of the state's many rare or endangered plants. It grows only in Mountain bogs, seeps, meadows and balds. PHOTOGRAPH BY KEVIN ADAMS.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

For all of its considerable charms, nature can be downright unpleasant sometimes. That just comes with the package. If you want the lily, you have to deal with the poison ivy. Enjoy the dragonfly, but avoid the mosquito. Love the deer, despise the rat.

SOUTHEASTERN COOPERATIVE WILDLIFE DISEASE STUDY

Deer hoof damage from hemorrhagic disease

Wildlife disease epidemics—known in the biologist's parlance as epizootics—are part of the deal, too. Eric G. Bolen describes in "Dealing with Wildlife Diseases" (page 26) how scientists conducted years of research before they learned how to handle these outbreaks. At one time, an epizootic was met with what Bolen calls "a shrug of fatalism." Now, wildlife managers can anticipate and prevent outbreaks, or at least restrict their spread. The days of wildlife diseases wiping out large populations of animals could soon be a bygone era.

How we treat wild animals and their habitat can make a life-or-death difference as well. If anglers continue to move fish around the state as detailed in "Bait Buckets and Aquatic Hitchhikers" (page 4), North Carolina's fish diversity and integrity could be disrupted to such an extent that it never recovers. This type of activity actually can result in the spread of epizootics—one bucket away from disaster, as the fish biologists sometimes say.

Back on terra firma, we have ongoing opportunities to protect and preserve the state's rare and endangered plants ("Drawing from our Biodiversity," page 20). Some of these plants are endangered due to habitat destruction. Others are threatened because they grow in one rare type of habitat. Biologists now better understand how to determine whether certain plants are rare, in trouble, or both. Sidney Cruze's story highlights a few of these wild gems and why they are on the list of plants needing protection.

Our hunting and fishing traditions also need protection. Years ago, these pursuits were the sole province of men, who passed them down to boys. Shari Smith grew to love hearing her male relatives talk about hunting and fishing ("My Place is in the Kitchen," page 8). Now, she guards these stories and promotes them through her work. We hope that this issue will show you a few of the ways you too can take an active role in protecting North Carolina's natural resources and outdoor traditions.

Greg Jenkins

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Timberdoodle Time

It was with great interest that I read your article on woodcocks ("In Praise of the Bogsucker," Dec. 2008). A fellow who works for the N.C. Wildlife Resources Commission gave my boy the December issue. I am an avid woodcock man. My twin boys, Luke and Ian, are both woodcock hunters. I have greatly enjoyed hunting them from Maine to Louisiana and everywhere in between! The boys started bird hunting last year and are really learning the game ... and they like it! After a day dealing with dense covers and under-par dogs I wonder why I like it sometimes. This is particularly true since now I am largely the flusher for two 13-year-old boys.

Clyde Sorenson said he was retired from hunting woodcocks, and I can understand completely. If it weren't for two dogs in their prime and two young men in theirs as well, I might do the same. They certainly re-energize one in the pursuit. I have an 8-year-old girl, too. This could go on for a long time! They are really learning to appreciate the absolute greatness of this bird, as well as being able to see it in so many different habitats with other wildlife as neighbors. Our hunts are really fabulous days together.

There just aren't many like-minded people when it comes to woodcocks. I don't share our hunts with those who regard them as feathered targets or trash birds secondarily taken to quail. Being an old quail guy, I understand those sentiments, but I came around.

Joe McMillan
Greenville

Dean Delights

The structure of *Wildlife in North Carolina* always serves up the dessert at the end: the last page — vignettes of the outdoor and sporting life — with the wonderful reminiscences of Jim Dean. It is the only magazine I begin reading on the last page — Jim's always a tasty dessert.

George T. Clark
Wilmington

I enjoyed Jim Dean's article "Hot Ducks" in the December 2008 issue. Many sportsmen think they know when the fish will bite or when the birds will fly, but I've seen so many of those people proven wrong over the years that I personally never make prophetic statements as to what the wildlife should or should not do on a given day. All I know is that I'm not going to harvest anything sitting at home on the couch. You've got to get out and give it a shot no matter what the conditions.

On another note, my brother-in-law was hunting Mattamuskeet the same week as Jim Dean last year and experienced the "soaring 70-degree" January heat wave firsthand. His result? Five birds in four days — not exactly a great hunt. He did say, however, that he heard a group down the lake shooting all day, every day. Perhaps that was the sound of Mr. Dean's 12 gauge!

Brandon Glenn
Kannapolis

Advanced Degree Work

In the January 2009 issue, Dr. Jasper Phillips Jr. wrote in his letter to the editor, "I believe the future of hunting may well depend on teaching the values of respect and sportsmanship to those who wish to continue the sport." As a nonhunting wildlife and outdoor advocate, I was compelled to learn more about problems associated with hunting and how it is perceived as a sport. I first talked to my son because I consider his family and their friends excellent examples of responsible hunting. He feels that a lack of sportsmanship, disrespect of animals and questionable hunting practices are fueling a negative societal opinion of hunting. I also discussed my concerns with hunting advocates in western North Carolina, and we agreed that there are major abuses urgently needing attention:

(1) For hunters, wildlife advocates and governing bodies, it is important to recognize that public lands such as state parks, national forests, wildlife refuges, national parks and game lands are owned by all of us. Organizations such as the N.C. Wildlife Resources Commission, N.C. Wildlife Federation and others would be wise to consider promoting changes that would help regain a level of sportsmanship and hunting ethics.

(2) The practice of using radio-collared dogs to hunt bears, deer and other animals should be re-examined. Hunting using this technology virtually eliminates the human factor and hunting skill. Changes would take courage but could be a step towards hunting regaining status as a wholesome outdoor activity and sport.

(3) Abuse of hunting regulations such as baiting, poaching, trespassing, thrill killing and improper disposal of wildlife remains are not adequately enforced or monitored. Violators need to be punished. Often violators do not receive appropriate fines or sentences, and simply resume their illegal behavior. Many responsible hunters and wildlife advocates feel this is a major weakness of the Wildlife Commission and other law enforcement agencies.

(4) Finally, outdoor education and responsible hunting emphasis need to be improved beyond the current efforts. Parents, environmental organizations, schools and governing agencies should all be brought on board in an attempt to educate everyone, but especially children, regarding their roles in protecting hunting rights, wildlife and habitat.

The heritage, tradition and wildlife we all value belongs to all of us — especially on public lands. Responsible stewardship and preservation of our wild animals and wild places is a gift we can give to future generations.

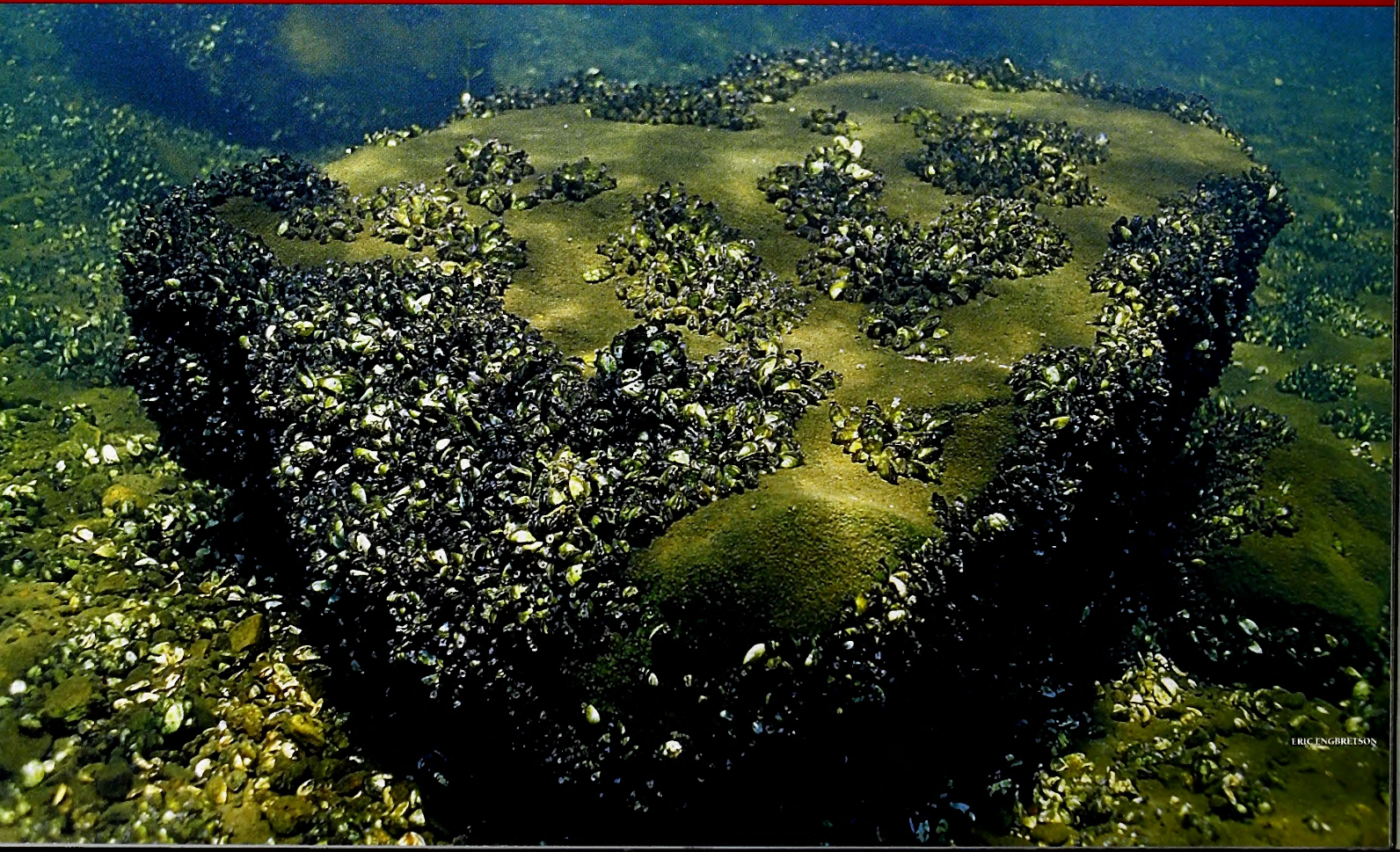
John Edwards
Cashiers

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

F. EUGENE HESTER

Bait Buckets and Aquatic Hitchhikers

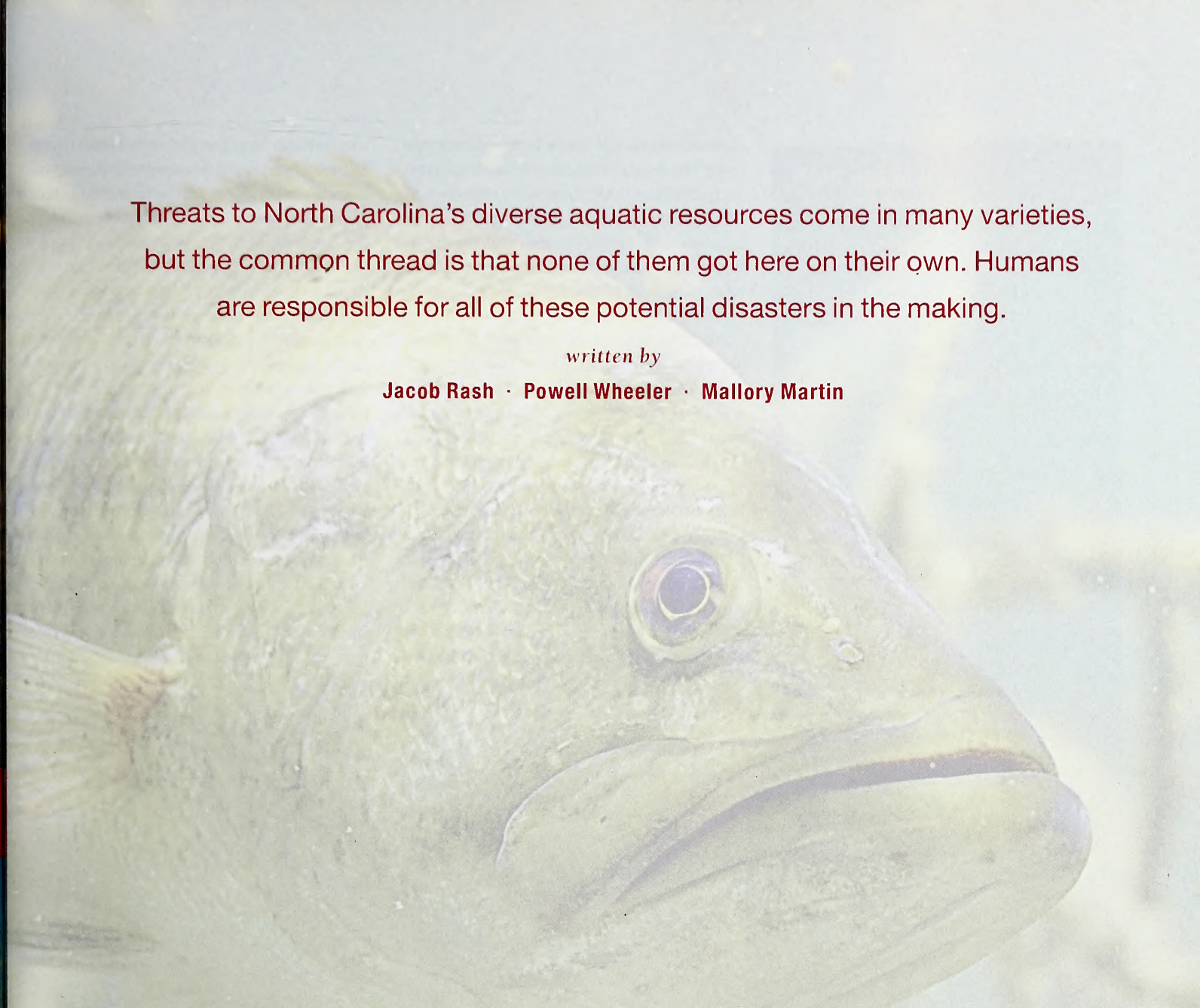


ERIC ENGBRETSON

Threats to North Carolina's diverse aquatic resources come in many varieties, but the common thread is that none of them got here on their own. Humans are responsible for all of these potential disasters in the making.

written by

Jacob Rash · Powell Wheeler · Mallory Martin



Unusual catches have always been a source of fascinating fish tales. Historically, stories of large, trophy-sized fish receive the most attention, but more and more, anglers have accounts to share of encounters with unfamiliar species.

In 2007, an angler reported catching an odd fish from upper Lake Wylie. This 31-inch, 13-pound fish was certainly something that you would not expect to catch on a May afternoon in North Carolina. The angler reported that the large fish was equipped with sharp teeth, and most remarkably, it was able to survive several hours out of water before it was released.

Sensing the uniqueness of the fish, the angler sent photos to fisheries biologists with the N.C. Wildlife Resources Commission. Through these photos, biologists were able to identify the fish as a Northern snakehead, a species native to Asia. Since appearing in the United States for the first time a few years ago in Maryland, Massachusetts and Pennsylvania water bodies, snakeheads have received a great deal of attention. Much of the interest surrounding them is due to the fish's exotic nature, which includes its ability to breathe air, and its aggressive and disruptive habits when established outside its native range.

Snakeheads, like all illegally introduced species, have the potential to disrupt resident fish communities. It is unfortunate that other introduced species such as white perch, spotted bass, river herring and various plants and microbes have not received the same amount of attention. They also can have negative impacts on the state's fisheries—something that should be of serious concern for people who depend upon and enjoy these resources. North Carolina's aquatic systems are under assault from a wide range of these introduced species.

ERIC ENGBRETSON

What's the Harm?

Consider the food web: Nutrients provide energy for microscopic plankton, which are eaten by small fish that ultimately serve as food for larger game fish. Nature is full of many of these interactions, which hang in a delicate balance. If anglers and fisheries managers are not careful and proactive, this ecological balance can be easily disrupted, and the consequences can be severe and long-lasting. It takes only one introduction of fish from a bait bucket or livewell to upset ecological stability and harm fishing.

For example, well-intentioned anglers have spread white perch (a native to the coastal waters of the Atlantic Ocean) across inland waters of North Carolina. White perch feed on the eggs of bass, crappie, striped bass, sunfish, walleye and white bass, just to name a few. In addition, white perch compete for available food with other young fishes — including sport fish. As a result, the introduction of white perch often leads to the decline of resident sport fish species.

In October 2008, biologists captured 35 white perch from Lake James during a routine sample for walleye. This collection confirmed that white perch are now present in all six Catawba River impoundments within North Carolina.

Another fish expanding its range in North Carolina is the spotted bass (or Kentucky bass). Spotted bass are often angler favorites due to the fish's aggressive nature. Unfortunately, this aggressiveness has encouraged illegal stockings and caused harm. With the increase in the diversity and number of bass, anglers often notice a brief improvement in a largemouth or smallmouth bass fishery after spotted bass are established. In reality, the honeymoon period is not likely to last very long.

Given time, spotted bass have the ability to outcompete resident largemouth and smallmouth bass and hybridize with them. Ultimately, spotted bass populations can become stunted (concentrated at small sizes). These threats are greater in the nutrient-poor reservoirs of the Mountain region of the state, where spotted bass often interbreed with smallmouth bass and directly compete with them for limited food resources. However, these impacts are not just relegated to Mountain impoundments. In Lake Norman, a recent study found hybridization between spotted and largemouth bass. In addition, the two fishes were shown to utilize similar food and habitat types. While illegal stocking of spotted bass may seem to enhance a fishery initially, the potential to replace resident bass with smaller spotted bass and hybrids negates the perceived short-term benefits.

Introduced game fish are not the only species that shift the ecological balance of fish communities. Forage fish introductions

F. EUGENE HESTER

BOB EVANS/NC DIVISION OF WATER RESOURCES

In October 2008, biologists captured 35 white perch from Lake James during a routine sample for walleye. This collection confirmed that white perch are now present in all six Catawba River impoundments within North Carolina.

Page 4: The zebra mussel can alter ecosystems and is very difficult to eliminate. Page 5: Largemouth bass virus infects this top inland game fish with few visible symptoms. Above left: White perch is perhaps the state's most widespread invasive fish in inland waters. Above right: Hydrilla is an invasive aquatic plant found in a number of inland reservoirs. Lower right: The spotted bass competes with the largemouth and the smallmouth for food resources.

ILLUSTRATIONS BY DUANE RAVER

can severely impact ecosystems as well. Blueback herring are a common bait fish for striped bass and hybrid striped bass, but their introductions have wreaked havoc on numerous white bass and walleye fisheries in North Carolina.

Anglers using blueback herring for bait established them in Lake Chatuge and Georgia's Lake Nottely where they were first noticed in the late 1990s. Despite their small size and delicate appearance, blueback herring were able to move downstream through hydropower turbines, and by 1998 they were established in Hiwassee Reservoir. Research has shown that blueback herring eat larval fish and fish eggs. As a result, walleye and white bass reproduction in Hiwassee Reservoir was virtually nonexistent by 2000. Similar research has shown the alewife, a cousin of the blueback, is equally destructive to sportfish communities.

It's Not Only Fish

In addition to adding unwanted fish species to new environments, stockings can spread fish diseases (illnesses that affect fish and not humans). Fish often carry disease without showing any symptoms, but without examination from a fish disease specialist, it is impossible to know if a fish is disease-free.

Recently, the largemouth bass virus, commonly referred to as LMBV, has been linked to die-offs of largemouth bass across the United States. It is common for infected largemouths to not display any signs of the virus until they become stressed, and at that time, the virus begins to damage the fish's swim bladder. Although it appears the virus is fatal only to largemouth bass, it can be carried by many members of the sunfish family, even healthy-looking bluegills.

Trout fisheries are also threatend by disease. The microscopic parasite that causes whirling disease has devastated rainbow trout fisheries in the western and northern United States. Because the parasite infects the host's brain and spine, young fish with whirling disease tend to spin or "whirl" when trying to swim. Death can occur from the infection alone, but often, the irregular swimming induced by the parasite causes mortality by reducing a fish's ability to feed and avoid predators. This Eurasian parasite was brought to the United States via fish stockings and is easily spread by the continued introduction of infected fish into new water.

Furthermore, the parasite can be spread by anglers who do not properly clean their gear following fishing trips to waters infected with whirling disease. In addition to parasites and diseases, other unwanted organisms can catch a ride on fishing gear and wind up causing damage to aquatic systems. Invasive aquatic plants such as hydrilla and giant salvinia, exotic mussels such as zebra and quagga mussels, and even algae, like didymo, can severely alter ecosystems and have tremendous environmental and economic impacts once they become established.

What Can We Do?

As responsible anglers, there are things we can do to prevent the spread of nuisance aquatic species. First, never transport water in your livewell or bait bucket from one water body to another. Dump your livewell water in the place you obtained it or on the ground. Second, always check your boat, boat trailer, boots, waders and fishing tackle for aquatic hitchhikers such as plants, animals and mud. Finally, take the time to properly clean and dry your gear. Before you relaunch your boat or enter another stream, wash and dry anything that has contacted water at another location. Not only will these steps help prevent the unintentional introduction of fish, but they will also assist in the effort to stop the spread of other nuisance aquatic organisms (including those not visible to the naked eye).

Remember, introduced fish can alter resident fish communities by competing with them, eating their young, altering their genetics and transmitting disease. The next time you hear people say they are going to "add more bait" or "stock more fish" by emptying their live wells or bait buckets into another body of water, think about the lessons learned over time and remind them of the possible consequences. They may think they are doing something positive, but let them know the truth: Illegal stockings ultimately can ruin your favorite fishing spot.

Anglers and agencies devote a lot of energy to the conservation and wise use of North Carolina's natural resources. Sadly, it takes only one misinformed individual to undo management efforts and permanently alter fishing waters. Illegal introductions and aquatic hitchhikers help create unstable and unpredictable environments that are difficult to manage and are unwanted by all.

Find Out More

N.C. Wildlife Resources Commission
www.ncwildlife.org

Protect Your Waters—
Stop Aquatic Hitchhikers
http://www.protectyourwaters.net/prevention/prevention_generic.php#3

Zebra and Quagga Mussel Information
http://nas.er.usgs.gov/taxgroup/mollusks/zebramussel/

United States Department of Agriculture—
Animal and Plant Health Inspection Service
http://www.aphis.usda.gov/

N.C. Exotic Pest Plant Council
http://www.se-eppc.org/northcarolina/

Didymo
http://www.epa.gov/region8/water/didymosphenia/

Largemouth Bass Virus
http://www.in.gov/dnr/files/LMBV.pdf

Do your part to help prevent the illegal introduction of fishes into your favorite waters by reporting wildlife violations in North Carolina to 1-800-662-7137. By acting responsibly and working together, anglers and the N.C. Wildlife Resources Commission can help maintain our fishery resources for future generations of anglers. As a result, we can ensure that our catches do not include unwelcome fishes, like snakeheads, and our fish tales do not focus on how things used to be.

Jacob Rash and Powell Wheeler are district fisheries biologists with the N.C. Wildlife Resources Commission. Mallory Martin is a longtime fisheries biologist who is now the commission's chief deputy director.

My PLACE is in the KITCHEN

In an era when hunting and fishing were the provinces of men, one girl learned to love the traditions of the field sports from her father's stories.

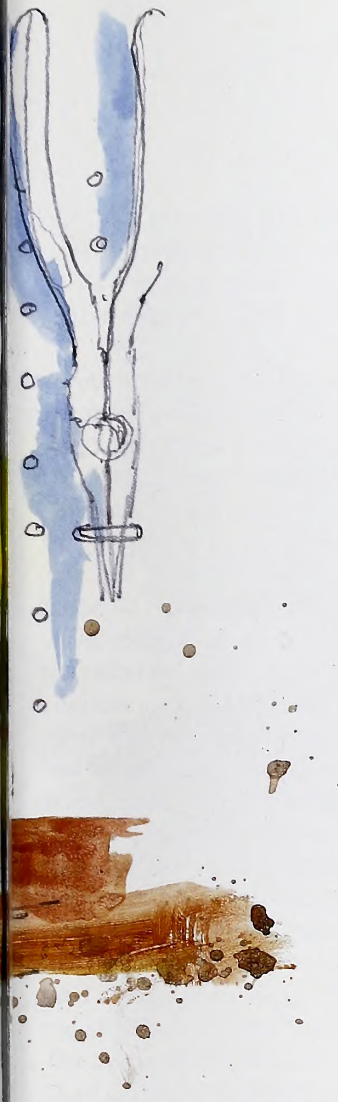
written by
SHARI SMITH

illustrated by
STAN FELLOWS

Girl children born in the 1960s were not taught how to shoot. Even the most progressive-thinking of fathers didn't consider it a rite of passage to stand his daughter up against a board fence so she wouldn't get knocked on her backside, point to a target of straw bales in an open pasture and tell her to pull the trigger. I walked past the gun cabinet a hundred times a day, begged an uncle or grandfather to hold me up so I could reach the deer head mounted on the wall above it. It was the one corner of the dining room that belonged to men. It held none of the things the women cared about — a great-grandmother's Haviland china or Aunt Maude's cut-glass butter dish. No one let me near any of that stuff. I could pet the deer, though, could be part of that sacred corner, but only with the help of a man.

My father was an excellent shot, and everyone in the county knew it to be true. I don't remember anyone having to tell me how straight his aim was. I just always knew. There were trophies in a case he built for himself, trophies of his countless wins at trap-shooting events. He let me play with those sometimes, rearrange them, read the inscriptions when I was older. Freezers stayed packed full of turkeys and hams, his winnings from shooting. Neighbors, too, shared in the spoils. When a pig got out of a fence and was hit by a car, maimed but not killed, those same neighbors came to get my dad to put it out of its misery. It was his job to do the killing of the steers on butchering day. My papaw bought him a gun special for the task. My daddy could shoot.

I remember standing at his side many times during his never-ending battle with groundhogs.



He explained to me that the holes to their tunnels were a danger to the horses and a danger to me if I was riding. I'm pretty sure he just plain hated them, their holes as good an excuse as any to shoot them dead. He would rest against the board fence and whisper, "Hold your ears, Sissy, I'm fixin' to nail him to the cross."

Shootin' things was men's work. I never thought to ask why.

Truth is, I didn't want so much to kill anything as to be a part of it all, the ritual of cleaning the guns, the packing for the hunting trips, the loading of the shotgun shells and that Holy Grail, the tackle box. My dad had a tackle box bigger than anyone who fished with him, and in my mind and in reality, you could have survived Armageddon using what was in that box. Four tiers of compartments splayed out on each side of the thing when opened, and because my dad and his dad, and I for that matter, carry a tradition of being resourceful types, that tackle box contained genius.

Dad discovered—I don't know how but suspect it originated in dares due to alcohol consumption—that a container of Old Spice stick deodorant was not only airtight and watertight, but that the damn thing would float. Once it had served the purpose of keeping him from stinking, it was cleaned out and fashioned into a holder for matches. "You never, ever, want your matches to get wet," he would say to me as he filled it and put it in exactly the right compartment. My people tend to lean toward the obsessive.

An empty pill bottle held cotton balls soaked in petroleum jelly so those desert-dry matches could be put to use. Knives were so sharp I was not allowed to hold them, even in their sheaths. Dad put his name on everything using one of those label makers, the kind you had to dial to get the right letter and then squeeze with both hands to make an impression on black tape.

I loved to see him get out the tackle box and prepare for a trip. I would sit on the floor watching, listening to him talk about this lure and that reel. I cannot remember one valuable piece of information, nothing that would be of any use in catching a fish or shooting a deer. I just loved hearing him talk. Before he left, I would say, "If you find an orphan deer, will you bring it home for me?" and he would promise to do exactly that, and then they would be gone, all of them, and I would be stuck with a family full of women.

They talked about people, the women in my family. They didn't speak of how straight their rows of corn were or how clean they kept their toolsheds. They never commented on the weather, never held a hand over their eyes for shade and said, "I believe that one is a redtail." They didn't sit

"You never, ever, want your matches to get wet."

That girl child still stands at the window and looks down a gravel road.

on the porch in the swing, cigarette glowing in the coming darkness, listen to the quail in the orchard and ask, "Can you hear them? Listen, now. Can you hear him say, 'Bob WHITE, Bob WHITE?'" No, their entertainment was a full-throttle thrashing of everyone living that they could think to name, and when they ran out of breathing folks, they moved on to the transgressions of the deceased. The women in my family never forget anything.

In a week, sometimes two, the men would be coming home, and I would stand at the window, staring down the gravel road, until my grandmother would say to sit down, I was worryin' her to death. Any sign of a vehicle meant it was more than likely the men. Heavy traffic was not an issue on our road. Soon, but not soon enough, there they'd be, unloading the take, carrying in the coolers.

That's when it got good.

If you were a quiet girl child, and I learned to be just that for this purpose, you could sit on the top steps of the basement and listen to the talk. They knew I was there. They must have. I don't recall much swearing. (It was my great-aunt Marvel, a fine, fine old woman, who taught me to cuss like a sailor. She chain-smoked, had a voice to prove it and mailed me books wrapped in brown paper.) There was excitement in these first hours home. I had to be patient, wait for them to settle down and get to the real storytelling. It was always, every time, worth the wait.

They did not teach me to shoot. Instead, I learned to measure flour. Biscuits, that's the first thing a girl on the farm learns to make. After my debut batch, my daddy said he believed those were the best biscuits he "ever eat," and not being a stupid child, I kept baking.

As long as food was brought to the table, they would stay there and talk. If you brought glasses of tea to the toolshed, they would take a minute to drink and talk. I could listen because I had to wait for them to finish so as not to leave my grandmother's glasses on the workbench. Only I forgot. Often. So when I was threatened with violence if I took any more of her precious Tupperware to the barn, I learned to open the refrigerator in the basement, the one that held only small bottles of Coca-Cola, stand on a chair to use the bottle opener bolted to a wooden block on the concrete wall and tote as many Cokes as there were men fixing something somewhere.

Grandfathers died, uncles divorced their way out of the family and a stroke took from my father his gift for hitting anything at which he pointed a gun. Men don't come home from the hunt anymore. I don't hear their footsteps on my porch, stomping off the mud, putting down the coolers. That is gone, and I miss it.

My father didn't write any books about his adventures. He was too busy working 18-hour shifts in the factory and coming home to help his father and his father-in-law work their farms, my maternal grandfather's own children being too sorry to be much help at anything, the root of my hatred for laziness. There are no written pages with the stories my father told, the stories he lived. Instead, his guns serve as his books, and I have them. I cannot shoot them, but I have them, and they tell me the story of the log that was sticking out of the water in a lake in Canada, the log my daddy thought might lurk large enough beneath the surface to damage a boat and so fired up the motor to steer around it. As he did, he watched the log become a bull moose and rise from the waters that kept the flies off his back. I know that story real good. I know them all. The women in my family never forget anything.

Now, on the back half of my 40s, I am dependent on the writings of Guy de la Valdene and Jimbo Meador. I am stuck waiting, waiting for the next book Charles Gaines will write, the next magazine article published, the next story John Currence will tell of the camaraderie and laughter, of the tradition and the table. I can only wait.

That girl child still stands at the window and looks down a gravel road. But now it is the postman who kicks up dust as he brings to her the stories of the hunt, books wrapped in brown paper. ◆

Shari Smith is a literary publicist who lives in Claremont. This is her first story for Wildlife in North Carolina.

But now it is the postman who kicks up dust
as he brings to her the stories of the hunt,
books wrapped in brown paper.

The Moving-Water SUNFISH

INHABITING FAST-MOVING WATER AND POSSESSING A VORACIOUS APPETITE, THE REDBREAST SUNFISH MAKES FOR AN APPEALING ANGLING OPPORTUNITY.

Written by Bruce Ingram

When I was 9 years old and a budding angler, I discovered redbreast sunfish. Many times on summer mornings, I would pedal my red Schwinn bicycle about a mile to a small tributary of the Roanoke River. From a small rise that overlooked a pool that featured riffles on both sides, I would toss my standard rig (a red-and-white bobber, a sinker and bits of earthworms impaled on a hook) to the expectant redbreasts that shared the pool with chubs and various members of the minnow clan.

ILLUSTRATION BY DUANE RAVER

That glorious summer of 1961 was when I decided that *Lepomis auritus* was a more formidable quarry than chubs. And when the latter would race toward the hapless crawlers more quickly than the former, I would pull the worms away from the chubs in hopes that the sunfish would strike the bait first.

Not too many more summers would pass before smallmouth bass displaced the redbreast as the primary object of my angling affection, but that is another story for another time. The truth is that this member of the sunfish clan has been a favorite of young North Carolina anglers—and older ones—for a long time. Kevin Hining, a fisheries biologist for the N.C. Wildlife Resources Commission, agrees. "For many folks in North Carolina, the redbreast was one of our first fish," says Hining. "Where I grew up in Rutherford County, we would often take a couple of small rooster tail spinners and fish for redbreasts in the tributaries of the Broad River near Lake Lure."

COMMON CHARM

Although the redbreast is on occasion found in Tar Heel State lakes and ponds, this species—unlike the bluegill and shellcracker (probably the state's two most popular members of the sunfish family)—is overwhelmingly a creature of North Carolina's Mountain and Piedmont streams. "Like the Broad, practically all of the tributaries of North Carolina's Piedmont rivers—the Catawba, Dan, Tar, Yadkin and others—have good populations of redbreast sunfish in them," continues Hining. "Redbreasts, though, can be found in literally every major drainage in North Carolina. The statewide distribution map for redbreasts looks almost identical to the one

for bluegill and largemouth bass — it pretty much covers the entire state.

"Generally speaking, redbreasts are sparse in the northeastern portion of the state, that is, the Perquimans and Pasquotank rivers, but numbers quickly improve as you move west into the Piedmont and on into the foothills. Redbreast densities then drop off again as you near the southwest portion of the state in the Little Tennessee, Hiawassee and Savannah rivers."

Virginia and North Carolina jointly manage that part of the New River that flows back and forth between the two neighboring states. Virginia state fisheries biologist George Palmer rates the upper New's population of redbreasts as "abundant."

HABITAT PREFERENCES

As noted, redbreasts are uncommonly found in lakes and ponds, as they are creatures of moving water. However, redbreasts generally avoid rapids and even riffles, preferring instead to hold in pools below swift water. "In the foothills and Piedmont of North Carolina, redbreasts can often be found in good numbers in small cool- and warm-water streams—that is, streams too warm to support trout year-round, and maybe a little too small for decent numbers of bass," states Hining. "While they are found in larger streams and rivers as well, I enjoy fishing small streams for redbreast because they are readily accessible and often overlooked. There's a good chance many readers have one of these streams within a five-minute walk from their homes. Nonetheless, often the prominent memories of fishing trips are from the 12-inch bass or stocked trout that unexpectedly hit our lures while we are casting for redbreasts."

Hining said that in all types of streams and rivers, redbreasts usually hold near cover in areas of slow to moderate current. Often, this means casting right up beside the bank, boulder or woody debris in a slow eddy, pool or run.

APPEARANCE AND LIFE HISTORY

In my opinion, the redbreast is the most beautifully colored of all the sunfish, and that includes such fellow members of the clan as the rock bass, bluegill, redear, pumpkinseed, warmouth and many others. During the spring breeding season, the male flaunts a crimson breast, which is why this species is sometimes referred to as the redbelly sunfish. Both sexes sport a long, diagnostic black gill flap, which has no red trim like the redear (also known as the shellcracker) does. The mouth is small, unlike that of the rock bass, and does not extend beyond the eye. Yellow sides are part of its anatomy, as are round pectoral fins. Stunningly beautiful turquoise streaks mark the cheeks.

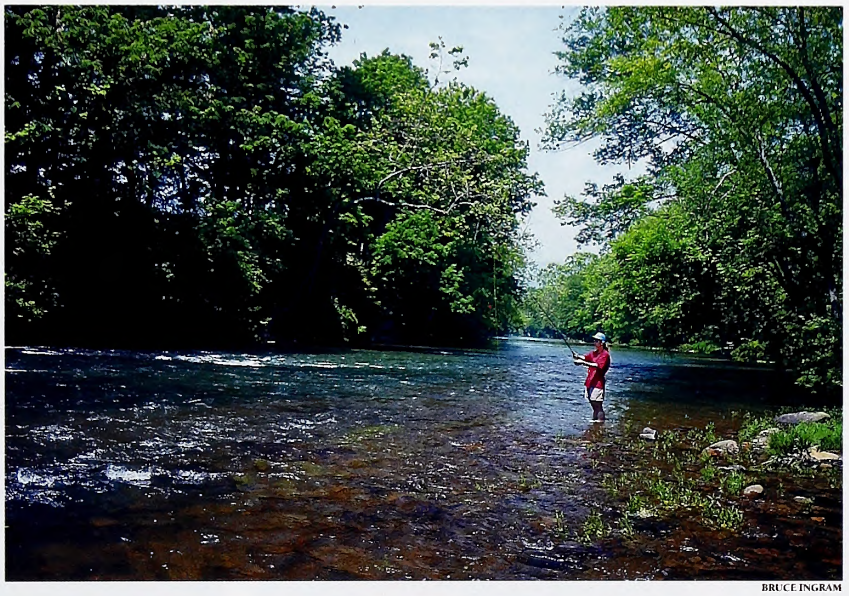
In May while floating the New, I often espy male redbreasts guarding their shallow-water

OTHER NAMES: ROBIN, BUT NEVER CHICKEN

Alternative names for the redbreast include redbelly (the color of a breeding male's breast), red throat, yellowbelly sunfish, bream, sun perch and perch. Kevin Hining says that in North Carolina this game fish is often called a robin, a name that I have never heard it called outside the Tar Heel State. Mallory Martin, chief deputy director of the Wildlife Commission and a longtime fish biologist, makes note of the moniker as well. "The common name for redbreast sunfish, robin, is very widely used in North Carolina, particularly in the southeastern section of the state," Martin says. "Many anglers know the fish only by that name."

One of the nicknames I have an issue with is yellowbelly, which often connotes cowardice. Anyone who has ever seen a male redbreast belligerently defending his nest or experienced the jarring strike of this species hitting a fly or lure knows that one thing this sunfish is not is a coward.

In my opinion, the redbreast is the most beautifully colored of all the sunfish, and that includes such fellow members of the clan as the rock bass, bluegill, redear, pumpkinseed, warmouth and many others.



BRUCE INGRAM

The redbreast, which sports a crimson breast during breeding season, prefers moving water.

nests in depths of 1 to 4 feet. When water temperatures reach the high 60s, the male (both sexes become sexually mature by the age of 2) fans out a nest about a foot in diameter, typically in pea gravel environs. After the female lays her eggs and the male fertilizes them with his milt, the former departs and the latter aggressively defends the saucerlike depression and its contents until the eggs hatch and the fry become free-swimming. Throughout the development of the eggs, the male fans the nest to prevent siltation and ward off predators. Redbreast nests are often close together, which obviously attracts numerous predators, from crayfish to much larger game fish.

The young feed on insects, snails, crayfish and fish smaller than they are, and will grow 1 or 2 inches their first year. By the age of 4, the survivors will be in the 6- to 7-inch range. The biggest redbreast I have ever caught measured 11 inches and weighed about a pound, both figures being well above average for this species in North Carolina and other states along the Atlantic Slope. The state record is a 1-pound, 12-ounce behemoth taken by Ronald Stanley from Big Swamp in Bladen County in May 1983. The fish fell for a Beetlespin.

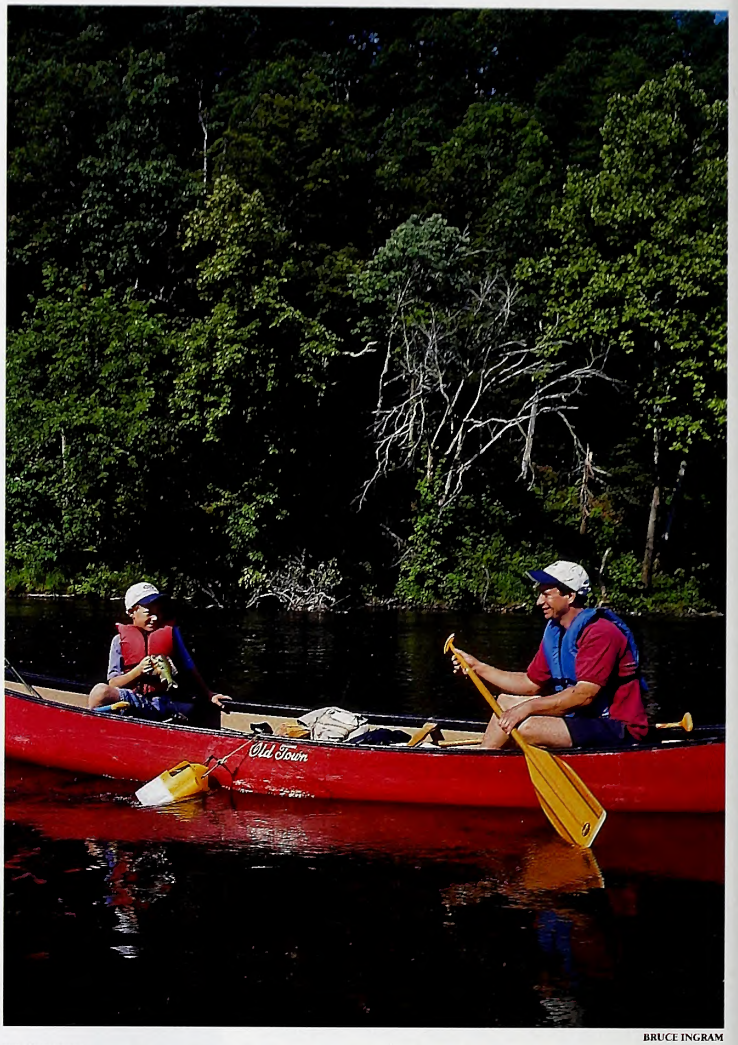
FLY-AND SPIN-FISHING TACTICS

Numerous tactics exist for catching redbreast sunfish. "In the northwest portion of North Carolina, I catch them fairly often with 4-inch lizard patterns while fishing for smallmouth bass in the New, Dan and main stem and larger tributaries of the Yadkin River. All of these have good redbreast populations," says Hining. "However, when I want to target just redbreast sunfish, I usually will fish smaller streams with ultralight tackle—mainly small spinners and rooster tails.

BRUCE INGRAM

Another great attribute of redbreast sunfish is that they often will take imitations of insects fished on and near the surface. This makes them a good fish to target with a fly rod and an assortment of popping bugs.

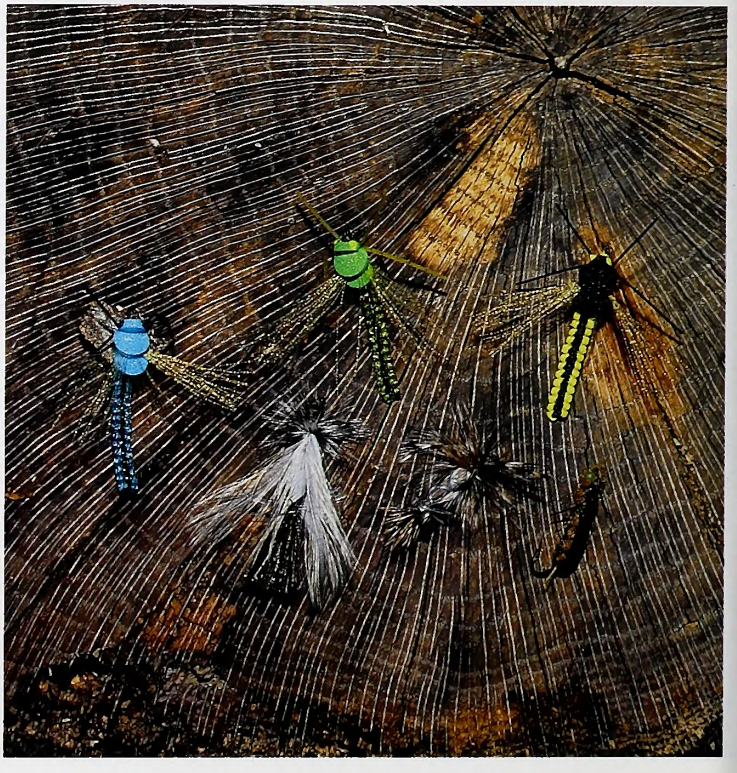
F. EUGENE HESTER



BRUCE INGRAM

F. EUGENE HESTER

BRUCE INGRAM



Although many anglers think smaller lures should be used for this fish, the author found that larger redbreasts are fully capable and willing to go after larger lures.

"Another great attribute of redbreast sunfish is that they often will take imitations of insects fished on and near the surface. This makes them a good fish to target with a fly rod and an assortment of popping bugs," Hining continued.

Norman Bass of Sparta used to live in the southeastern part of the state and often dueled with redbreasts there. "On the Northeast Cape Fear River, we caught redbreasts anywhere there was current over sandy bottoms," recalls Bass. "We used most any small spinner-type lure that you could fish slow enough to let sink to the bottom. In the spring we caught them on popping bugs with fly rods."

I would guess that the conventional wisdom among many if not most Carolina anglers is that they should downsize their lures and flies when specifically targeting redbreasts. However, an incident that occurred several years ago forever changed my mind in that regard. I was employing a quarter-ounce buzzbait for smallmouths and tossing it to downed trees that lay perpendicular to the shoreline. For whatever reason, that day the smallmouth action was poor, but I caught four redbreasts that absolutely blasted the buzzer. All of them ran between 9 and 10 inches and weighed about three-quarters of a pound.

During that same time frame, another incident hammered home the fact that larger redbreasts can easily engulf larger lures. I had filled a home aquarium with dace and crayfish and decided that I would go to a nearby creek and try to catch a redbreast for the aquarium. My goal was to observe how the sunfish and the prey species reacted to each other. I was able to catch an 8-inch redbreast and subsequently released it into the aquarium. As expected, the redbreast quickly made short work of the crustaceans and minnows, so I dangled a 6-inch plastic worm, sans hook, in front of the game fish. To my amazement, he quickly inhaled the entire crawler and even was loath to let go when I pulled the line toward me.

Over the next two days, I repeated the worm maneuver several times, and on each occasion the sunfish swallowed the bait, along with additional minnows and crayfish that I had released into the aquarium. On the fourth day, I decided to release the voracious creature back into the creek it came from, as it was simply too much work to keep it fed.

My point is that if good-sized redbreasts will savage quarter-ounce buzzbaits and 6-inch plastic worms, we need not worry about downsizing our baits and flies for them. If you want to duel with larger redbreasts, employ the same lures you would use for smallmouth, largemouth and spotted bass in those same rivers and creeks.

For example, some of the lures that I have caught my biggest sunfish on are 3-inch hard plastic jerkbaits, 4-inch plastic lizards and quarter-ounce spinnerbaits. Among fly patterns, I have done well with damselfly and dragonfly imitations, size 4 poppers and various streamers.

The redbreast sunfish is a fascinating creature, a hard-hitting game fish and a delightful species for which to angle. The moving-water sunfish is simply an integral part of North Carolina's freshwater scene. ◆

Bruce Ingram has written four books on river fishing, among them the "New River Guide" and his latest, "Fly and Spin Fishing for River Smallmouths." To purchase a copy, contact him at be_ingram@juno.com.

A FEW FUN FEMALE FACTS

Female redbreasts can lay 3,000 or more eggs.

More than one female will deposit her eggs in any given nest.

The older the female, the more eggs she is likely to produce.

Her eggs often take three to five days to hatch.

Females have nothing to do with the egg-guarding process.

The eggs appear transparent yellow in the water.

Drawing FROM OUR BIODIVERSITY

written by SIDNEY CRUZE *& illustrated by* PATRICIA SAVAGE, JEANNINE D. REESE *and* KATHLEEN WYCHE

ALTHOUGH OUR STATE IS HOME TO AN IMPRESSIVE ARRAY OF RARE FLOWERING PLANTS, THE NUMBERS OF THESE FASCINATING SPECIES ARE DWINDLING.

North Carolina's varied landscape is home to more than 4,000 native flowering plants. Yet, as the state's population grows, natural land is disappearing, putting many of them at risk. Today, 740 species are considered rare or significantly rare. Each is integral to a plant community, where a decline in one species can impact the entire habitat. A staggering 47 plant species have been assigned North Carolina's "threatened" status, which means they are likely to become endangered in the foreseeable future. (An endangered species is in danger of extinction throughout all or a significant portion of its range.) Threatened plants, such as the species described here, cannot be removed from the wild without a permit from the North Carolina Plant Conservation Program.

Appalachian Filmy Fern

Trichomanes boschianum occurs in the unique plant community that occupies the moist rock grottoes behind waterfalls along the Blue Ridge Escarpment. It is found in the westernmost counties of North Carolina, in the Chattooga and Cullasaja river gorges, where spray from the falls and shelter from rocks and trees provide the constant humidity and even temperatures the fragile fern needs to survive. Although it was once known in five locations in the state, this increasingly rare fern has only two currently known populations.

The perennial gets its common name, Appalachian filmy fern, from its translucent emerald green leaves, which are only a single cell thick. It is one of the few filmy ferns—a primarily tropical family—that live north of Mexico in North America, and it is found in 13 Eastern states, ranging from Virginia west to Arkansas and north to Illinois. In North Carolina, the fern is associated with the dwarf filmy fern (*Trichomanes petersii*), cave alumroot (*Heuchera parviflora*) and meadow spikemoss (*Selaginella apoda*). Botanists speculate that several thousand years ago, when the Earth's climate was warmer, these plants thrived in other locations. Over time they have retreated to the temperate wet recesses of the rocky outcrops.

ILLUSTRATIONS BY PATRICIA SAVAGE

Eastern Prairie Blue Wild Indigo *Baptisia australis* var. *aberrans*

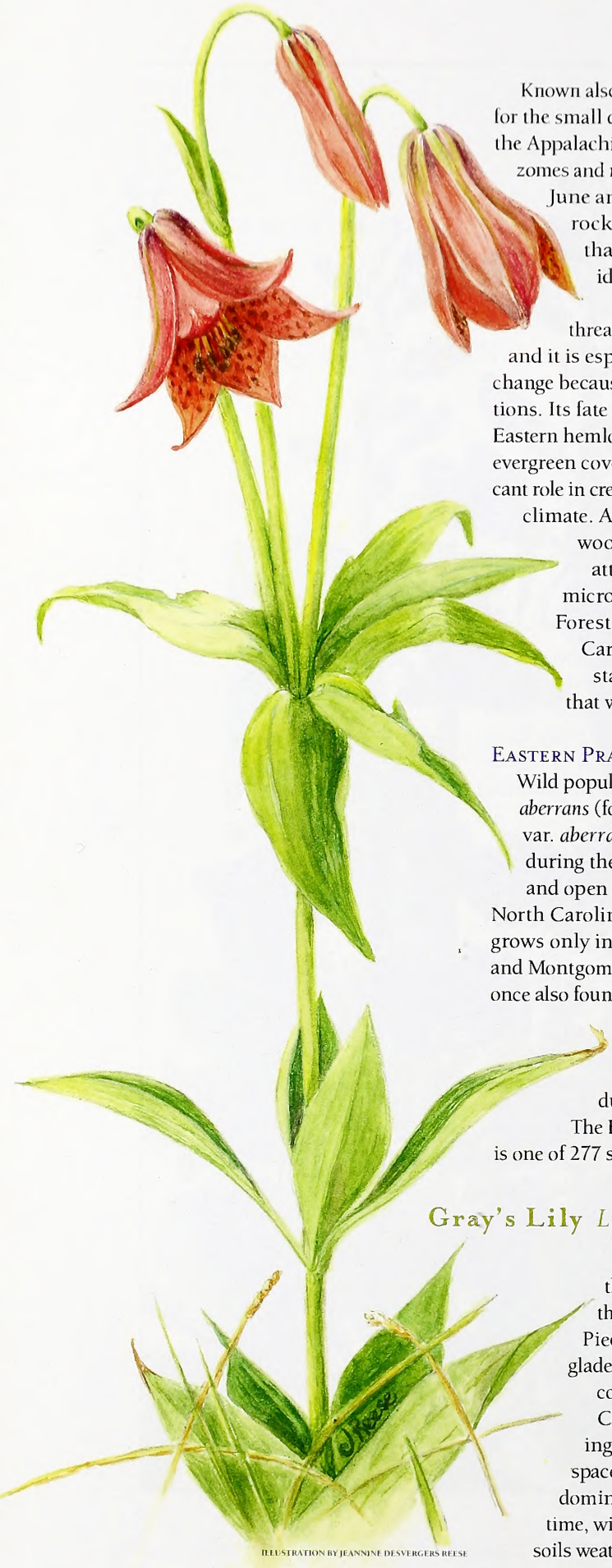


ILLUSTRATION BY JEANNINE DESVERGERS REESE

Known also as the Appalachian bristle fern for the small dark hairs that cover its stems, the Appalachian filmy fern grows from rhizomes and reproduces from spores between June and September. It hangs from rock ceilings, with slender stems that can reach 1 meter long in ideal conditions.

Poachers and trampling threaten the Appalachian filmy fern, and it is especially vulnerable to climate change because it rarely survives dry conditions. Its fate is also tied to the health of Eastern hemlock trees. By providing a dense evergreen cover, the hemlocks play a significant role in creating the ferns' preferred microclimate. As infestations of the hemlock woolly adelgid (*Adelges tsugae*) attack and kill the trees, these microclimates are at risk. The U.S. Forest Service is working in North Carolina and other Appalachian states to rear and release beetles that will eat the adelgids.

Eastern Prairie Blue Wild Indigo

Wild populations of *Baptisia australis* var. *aberrans* (formerly known as *Baptisia minor* var. *aberrans*) grow in clay soils formed during the Triassic period along glades and open spaces in Piedmont forests. In North Carolina, the perennial legume now grows only in Caswell, Durham, Granville and Montgomery counties, although it was once also found in Cabarrus, Person and possibly Orange counties. Its graceful spikes of blue flowers sway in spring breezes during April and May.

The Eastern prairie blue wild indigo is one of 277 species associated with some of

Gray's Lily *Lilium grayi*

the rarest plant communities in the state, specifically those of the Piedmont prairies, savannas and glades. Two hundred years ago these communities thrived amid North Carolina's forests, at sunny openings where trees were widely spaced and grasses and wildflowers dominated the ground cover. At the time, wildfires, topography and unique soils weathered from usual rocks such as diabase and gabbro, together with large grazing animals such as elk and bison, prevented woody plant growth from creating dense shade on the forest floor. The prairies disappeared as people fragmented the landscape, fires became less prevalent and animals became extinct. Today they are reduced to small remnants of the natural habitat, and the species that once occupied the prairies find refuge in open spaces created by roads, power lines and utility rights-of-way.

Often confused with *Baptisia australis* var. *australis*, a related variety popular with gardeners across the Southeast, Eastern prairie wild indigo is found only in Alabama, Georgia, Tennessee and North Carolina. It is smaller and less bushy and has a shorter bloom time than *B. australis* var. *australis*. Both look similar to true indigo (*Indigofera tinctoria* L.), which was brought to this country from India and cultivated for dye.

As with other legumes, the prairie wild indigo has roots that fix nitrogen by hosting bacteria that convert the inert form of this nutrient into one that is usable for the plant. Its biggest threats are development, fire suppression and the competition from dense growth of woody plants that results from fire suppression. State agencies and conservation organizations use controlled fires to restore the plant's native habitat.

Georgia Aster

Symphyotrichum georgianum grows in open woods and along roadways and power line rights-of-way in the Piedmont. Like the wild indigos, it was once a plant of the open Piedmont prairies and savannas. Beautiful flowers the size of a quarter appear in October. The flower rays are purple, and the center disk flower is white with white pollen.

The Georgia aster is also a Piedmont prairie species. There are 60 populations remaining in the United States, in Alabama, Florida, Georgia, North Carolina and South Carolina. Currently, 25 of those populations naturally occur in our state. At least six populations have been extirpated. When flowering, this species is easy to distinguish from other purple flowering asters because of its large flowers with purple rays and a white center. Like other asters, it is attractive to bees, butterflies and hummingbirds. Birds and rabbits love to eat the seeds.

This aster is one of only two North Carolina plants listed as an active candidate

for federal endangered species status. It is threatened by fire suppression, highway expansion, development and herbicides. Plant conservationists are working with energy companies and state agencies to make sure the plants are not mowed or sprayed with herbicides.

Gray's Lily

Lilium grayi is named for the legendary botanist Asa Gray, who visited North Carolina in the 1800s. He collected the lily on his beloved Roan Mountain in Mitchell County. The Gray's lily has a delicate bell-shaped red flower that tilts forward, hiding a sprinkle of purple speckles inside. Hummingbirds pollinate the perennial, which seems to grow best in sunlight at high elevations. It grows up to 4 feet tall in the bogs, wet meadows, seeps and grassy balds of northwestern North Carolina, and its red flowers dot the landscape in June and July.

Gray's lily is found only in North Carolina, Virginia and Tennessee, and most of the world's populations—60 total—live in North Carolina. Here it is seen near bee balm (*Monarda didyma*), Appalachian turtlehead (*Chelone lyonii*) and Turk's-cap lily (*Lilium superbum*) in forested areas. On grassy balds, it grows close to green alder (*Alnus viridis*) and Catawba rhododendron (*Rhododendron catawbiense*).

North Carolina's Plant Conservation Partners

As acres of open space are transformed by development, the number of threatened plants is increasing in North Carolina. But there is some good news. Several organizations are working to safeguard the natural biodiversity in our plant communities.

Our endangered, threatened and special concern species have legal protection through the N.C. Plant Protection Program. The N.C. Natural Heritage Program serves as a biological brain trust, conducting county inventories to find our state's rare species and maintain these records, providing the public with the information it needs to evaluate rarity of species and natural communities and assess the ecological impact of land-use decisions. NatureServe functions as an information clearinghouse for rare species data across the nation.

A statewide network of 23 land trusts collaborates with other organizations, such as The Nature Conservancy, the Plant Conservation Program, the N.C. Division of Parks and Recreation and the N.C. Wildlife Resources Commission, to prioritize and protect land that provides habitat for rare species. The Natural Heritage Trust Fund and Clean Water Management Trust Fund provide millions of dollars for land conservation annually.

The Center for Plant Conservation, a national organization that oversees the collection and curation of seeds for rare and endangered species, works closely with the N.C. Botanical Garden to preserve genetic diversity. Although seed saving is a valuable conservation tool, it is considered best to protect rare plants within their natural habitat. The N.C. Botanical Garden grows rare species on-site, conducts prescribed burns to restore habitat, monitors rare plants in the wild and reintroduces them to appropriate environments.

In some mountain wetlands, Gray's lily hybridizes naturally with the Canada lily (*Lilium canadense* var. *editorum*), a closely related species that is even rarer in North Carolina than Gray's lily. The result is *Lilium X pseudograyi*, a hybrid that has traits from both species and varies in appearance from site to site, making it hard to identify.

Poaching, trampling, habitat destruction, and rabbit and deer browsing pose threats to the lily. It also is susceptible to anthracnose (*Colletotricum* sp.), a common fungus that prevents it from setting seed. Research indicates that sunlight may reduce fungal infections in Gray's lily, and some canopy clearing now takes place near populations living on public lands. Conservation organizations are working to protect the plant's habitat from development.

Plymouth Gentian

The showy *Sabatia kennedyana* grows along the sandy, sometimes submerged banks of the Waccamaw River and its tributaries. The perennial has large fragrant pink-and-yellow flowers that bloom — often 25 to a plant — from early July to mid-September.

The Waccamaw River is a blackwater river that originates at Lake Waccamaw and winds its way through the largest remaining cypress-gum swamp in North Carolina. Each year the river rises with winter rains and recedes in dry summer months, creating a constantly changing environment along its banks. The Plymouth gentian relies on this pronounced water fluctuation to discourage other plants from growing nearby and competing for resources.

Outside North Carolina, native Plymouth gentian populations live only in the coastal plains of Nova Scotia, Massachusetts, Rhode Island and South Carolina. Botanists suspect the last ice age created conditions favorable for the plants in the South. Studies are under way to determine whether the Northern and Southern plants are the same species, or whether evolution has separated them into different species or varieties since they have been separated geographically.

The Plymouth gentian is vulnerable to changes in hydrology, especially water table drawdown throughout the Waccamaw River basin, where development, sewage, agriculture and timbering contribute to the problem. Invasive exotic plants, such as alligator weed, also pose a threat by outcompeting for habitat. Conservation organizations and state agencies are working to protect land throughout the watershed.

Seabeach Amaranth

Amaranthus pumilus is a low-growing annual found on North Carolina's barrier islands. The plants have oval spinach green leaves and spread up to 2 feet wide, with larger plants reaching 4 feet across.

The seabeach amaranth lives in the upper beach — the hot, sandy open space between the high-tide mark and the dunes — and it is a pioneer species in this sparse environment. One plant can produce thousands of seeds, which get spread by wind and water throughout the summer.

Found from Long Island, New York, to South Carolina and listed as federally threatened, the seabeach amaranth is endangered by natural and man-made forces. In North Carolina, people pose the biggest threat. Oceanside development and beach stabilization eliminate the open, wind-blown environment the plant needs. Once a beach stops

A Growing Art Form

The N.C. Botanical Garden's Certificate in Botanical Illustration program provides comprehensive courses in botanical illustration to those who wish to improve their skills in drawing and painting plants in a technically detailed manner. Studies leading to the certificate enhance the experience of both the professional and the dedicated amateur botanical artist in accurately portraying artistic and scientific images.

The program is designed to give enrollees a well-balanced curriculum combining a basic scientific background in botany with visual arts theory and practical experience using various media, including graphite pencil, pen and ink, colored pencil, and dry-brush watercolor. Classes are taught by the garden staff and other area art and botany professionals. For more information about the program, contact the N.C. Botanical Garden at ncbg@unc.edu or (919) 962-0522.

NATURE'S WAYS

How Do Carnivorous Plants Capture Prey?
See Nature's Ways, page 39.

shifting, it erodes away, or other plants take root and compete with the amaranth for resources. Vehicle traffic and trampling from recreational beach users also pose threats.

The seabeach amaranth plays an important role in the barrier island environment, and conservation efforts are under way to protect the plant. Seeds are stored in a seed bank at the N.C. Botanical Garden, and state and federal agencies monitor populations annually.

Small's Portulaca

Portulaca smallii is named for Southeastern botany guru John K. Small. It is an annual succulent that lives in the thin sandy soil atop granite outcrops in the Piedmont.

Low growing with cigar-shaped leaves and fuzzy pink flowers, the Small's portulaca is well adapted to the extreme conditions created by this rocky environment. In late spring it goes from a seedling to a mature plant in almost four weeks. Within a week of flowering, it will produce small black seeds that get dispersed by birds and rainfall.

Small's portulaca blooms between June and August. It is endemic to granite flatrocks. Wild populations stretch in a diagonal line from central Georgia through southern Virginia. Today, Small's portulaca is found in only five North Carolina counties: Cabarrus, Franklin, Granville, Rowan and Wake. The species was historically known from Forsyth County.

Although Small's portulaca has a low tolerance for competition from other plants (including invasive exotic species, which invade flatrocks), its biggest threat is habitat destruction. Conservation organizations and agencies have protected a number of sites that include granite outcrops. One is Mitchell's Millpond State Natural Area in Wake County. ◆

Sidney Cruze is a freelance writer who lives in Durham. She writes about land conservation and sustainable agriculture in North Carolina.

Illustrator Patricia Savage is an instructor for the certificate program. Jeannine DesVergers Reese and Kathleen Wyche are graduates.

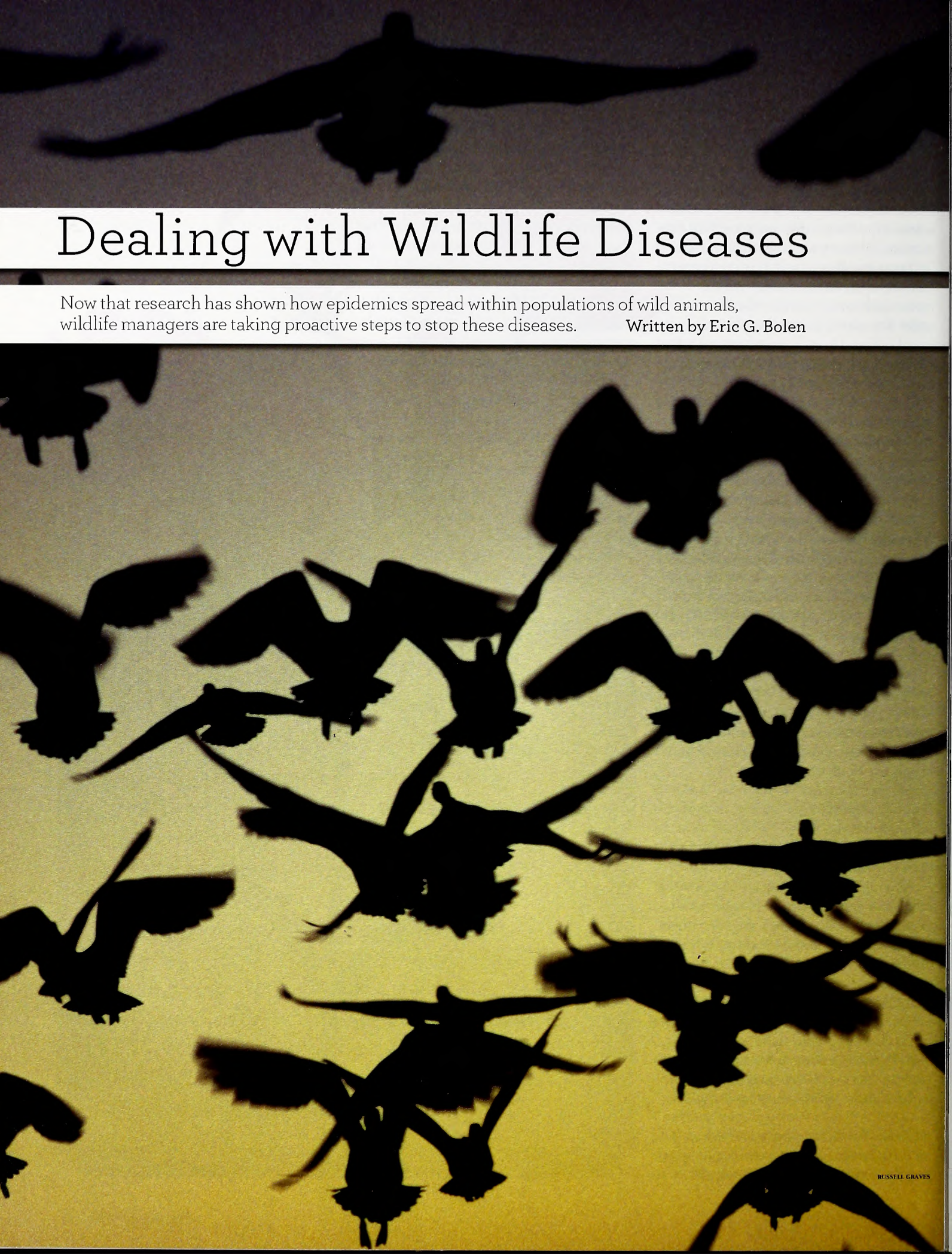
Plymouth Gentian *Sabatia kennedyana*

ILLUSTRATION BY KATHLEEN WYCHE

Dealing with Wildlife Diseases

Now that research has shown how epidemics spread within populations of wild animals, wildlife managers are taking proactive steps to stop these diseases.

Written by Eric G. Bolen



A wobbly, spasmodic deer, an emaciated duck or a fox with patches of exposed, encrusted skin. Sad sights, to be sure, and all are victims of disease. How serious a threat might these diseased animals be, not only to others of their kind but also to livestock, to hunting or even to human health? And how much wildlife disease and death might be preventable?

For decades, wildlife diseases were regarded as "acts of God" —not unlike disastrous storms—and therefore were dismissed as unwelcome but inevitable events that befell animal populations. Wildlife managers generally responded passively, except perhaps to impose more restrictive bag limits on disease-reduced game populations, with virtually no action forthcoming for diseased nongame species. Nothing could be accomplished by clinical ministrations to those few individual animals that might come to hand from wild, free-roaming populations beset by disease. This was an era—the first of four—marked by a shrug of fatalism.

Next came an era of concern. Managers now recognized that action was needed when diseases attacked wildlife, but knowledge of the pathogens and their transmission was so meager that effective responses remained unknown. Passive fatalism was finally on the wane, yet frustration remained because of managers' inability to act positively.

The third era began when managers initiated measures to stem what are known as epizootics—the wildlife equivalent of human epidemics. Common responses were the pickup and disposal of dead and dying animals, and the alteration of habitat in ways that reduced the hazard. Research also began to yield information about epizootiology, the "how and why" of wildlife diseases and the counterpart of epidemiology in humans. For example, research determined that the lethal toxin produced by a bacterium thriving on aquatic invertebrates killed by declining water levels initiates epizootics of botulism, a disease that in some years kills tens of thousands of waterfowl on a single wetland. Such knowledge in turn often triggers a remedy. Where managers can control water levels, as is the case at many wildlife refuges, disease-prone marshes are reflooded to curtail the massive

F. EUGENE HESTER

BILL LEA

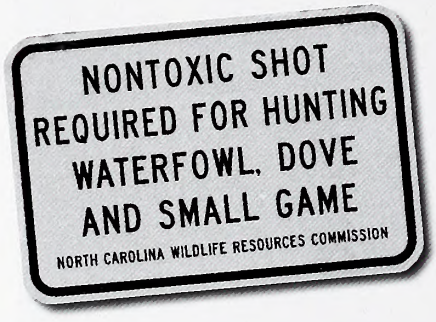
Wildlife diseases, once considered inevitable acts of God, affect many different species of game and nongame animals. Waterfowl (left) are susceptible to such diseases as botulism and duck plague, mourning doves (top right) to trichomoniasis and white-tailed deer to epizootic hemorrhagic disease.

F. EUGENE HESTER

RUSSELL GRAVES

MASLOWSKI WILDLIFE PRODUCTIONS

Gray squirrels (top) often are infected with botfly larvae, and house finches (right) can suffer from conjunctivitis. Wildlife managers discovered that draining wetlands can stem botulism in waterfowl.



die-off of invertebrates and thus curtail further toxin production. Alternately, wetlands may be drained so that waterfowl go elsewhere and thereby avoid exposure to the deadly conditions.

For the most part, the fourth and final era still lies ahead. This is prevention—the ideal way to short-circuit diseases striking wildlife and humans alike. But it is one thing to inoculate children with essentially 100 percent coverage and effectiveness for such maladies as measles, yet quite another to end the exposure of mourning doves to a parasitic protozoan causing fatal epizootics of trichomoniasis. Still, there are some successes in managing wildlife diseases, one of which resulted from administrative decisions rather than biological treatments. The fatal disease known as lead poisoning, which occurs when waterfowl ingest spent lead shotgun pellets (mistaking these for seeds and grit), essentially ended when regulations required that waterfowl hunters use steel or other nontoxic shot. Before the change, some 2 million ducks and geese needlessly died each year in North America.

Despite the victory over lead poisoning in waterfowl, experts nonetheless believe that habitat conditions influence the course of many wildlife diseases, as suggested in the relationship between drying marshes and epizootics of botulism. If so, greater control over diseases becomes an attainable goal of wildlife management, with habitat manipulations functioning as "wildlife medicine." Still, the epizootiology of many pathogens remains unclear, for now dampening a broader application of this concept as a means of disease management.

WHY BOTHER?

Several factors underscore the importance of wildlife diseases. High among these is the role of domestic and wild animals as reservoirs or vectors for pathogens that ultimately affect each other or, indeed, humans. Early in the last century, an epizootic of hoof-and-mouth disease in livestock triggered the slaughter of some 22,000 deer in a national forest in California; about 10 percent of the deer showed symptoms of the disease. More recently, a disease known as brucellosis underlies the shooting of bison moving seasonally from Yellowstone National Park to grazing lands in adjacent Montana. Ranchers believe bison act as reservoirs for the disease, which causes abortion, reduced milk production and infertility in cattle but seldom affects bison. In some years hundreds of bison have been shot in Montana despite the lack of sound evidence to support the ranchers' claims.

The scourge of rabies is a well-known threat to human health. The disease is fatal unless detected and treated in its early stages. Foxes, skunks, bats and raccoons are the primary reservoirs for rabies, although the

relative importance of these species varies somewhat by region, with raccoons prominent in North Carolina, skunks in Ohio and foxes in Kentucky.

Whereas rabies has a long history in its effect on humans, pets and wildlife, chronic wasting disease (CWD) ranks as one of the emerging diseases—those maladies appearing somewhat suddenly in recent years. Another is West Nile virus, which infects birds, particularly those in the jay family, as well as humans.

CWD attacks deer and elk and other members of the cervid family and is in the same family as "mad cow disease" in livestock and Creutzfeldt-Jakob disease in humans, all producing microscopic spongelike spaces in brain tissue. Before dying, infected individuals become uncoordinated and lurch about, drool and otherwise behave abnormally.

CWD is endemic in parts of Colorado, Wyoming and Nebraska, but it also has been recorded in four states (Wisconsin, Michigan, New York and West Virginia) east of the Mississippi. Little is known about how it spreads. There is no cure or vaccine for CWD, which is always fatal.

Curiously, the pathogens causing these spongiform diseases are not bacteria, viruses or parasites but instead are rogue proteins known as prions that twist normal proteins into abnormal shapes matching their own. These malformed proteins cannot function normally and thus cause physical degeneration. Moreover, the prions are not attacked by the immune system and can survive freezing, boiling and often harsh fixatives such as formaldehyde.

Lyme disease is widespread in the eastern United States, with up to 10 percent of the human population becoming infected in some locations. It is the most commonly reported vector-borne disease of humans in the United States; as many as 16,800 cases have been reported in a single year. The pathogen causing Lyme disease, a spirochete bacterium, is transmitted primarily by deer ticks, which have spread—along with the disease—as deer have repopulated suburban areas, abandoned farmland and other habitat.

Deer, however, are not reservoirs for the disease, which instead may be harbored by a variety of birds and mammals, although the white-footed mouse is a common and efficient reservoir. In humans, Lyme disease produces arthritic joints, abnormal heart

How sick is North Carolina's wildlife?

As might be expected, North Carolina is no more immune to wildlife diseases than any other geopolitical area. Epizootic hemorrhagic disease (EHD), for example, crops up regularly in Southern deer herds, appearing suddenly when its vectors, tiny flies known as midges or gnats, erupt after heavy rainfall in late summer or early fall.

Deer thus may be infected early in the hunting season, but the epizootic quickly ebbs when the first frost depresses the midge population. Infected deer die quickly, often in large numbers, but survivors apparently acquire immunity to the pathogen—a virus—so that at any given location, the disease often lapses for three to five years after the previous epizootic. EHD was the impetus for establishing the Southeastern Cooperative Wildlife Disease Study (SCWDS) in 1957 at the University of Georgia.

N.C. Wildlife Resources Commission biologists remain vigilant for evidence of chronic wasting disease (CWD), another disease that affects white-tailed deer and other members of the cervid family. So far the disease has not appeared in North Carolina, but deer hunters are nonetheless cautioned to wear rubber gloves when field-dressing carcasses and to avoid eating certain body parts, among them the brain and spleen. As of 2006, hunters may not bring into North Carolina carcasses or carcass parts of cervids they have killed in states or provinces where CWD occurs without taking certain precautions. (Visit www.ncwildlife.org for more information.) North Carolina also prohibits importation of live deer and elk in its effort to keep out CWD.

RUSSELL GRAVES

BILL LEA

Some of North Carolina's deer herd becomes infected every few years with epizootic hemorrhagic disease, which is caused by a biting midge. The outbreak disappears when cold weather arrives.

Gray squirrels experience nonlethal but grotesque infections of botfly larvae. At times botflies may infect a large percentage of the squirrel population—40 percent in North Carolina—producing unsightly lumps under the skin of the parasitized individuals. As a result, hunters once discarded thousands of disfigured squirrels each season, and some quit squirrel hunting altogether. Although these infections don't diminish squirrel populations, they do waste a wildlife resource. After study revealed that most of the botfly larvae emerge and leave their hosts by the end of September, the waste largely ended when the opening of the squirrel season was rescheduled for later in the autumn (Oct. 13 in 2008). The revised regulations prevented the waste of some 880,000 gray squirrels in a single season.

Canine distemper virus appears in local gray fox populations in North Carolina about every three years. This is an Old World disease that takes a heavy toll on native gray foxes, which lack immunity,

continued on page 31

MASLOWSKI WILDLIFE PRODUCTIONS

RYAN VON LINDEN / NEW YORK DEPT. OF ENVIRONMENTAL CONSERVATION

MILTON FRIEND

Raccoons (top) are a common reservoir of rabies in North Carolina. Eastern cottontails (above) also suffer from botfly infestations. White nose syndrome is a new disease affecting bats in the Northeast.

rhythm and neurological difficulties. These symptoms may not appear for several weeks or months after the disease is contracted, and, unfortunately, the illness does not ordinarily produce immunity from additional infections.

Another concern focuses on the impact of reduced habitat, both in quality and quantity, which often concentrates wildlife populations and thus increases stress and the chances of spreading contagious diseases. These conditions are particularly important for waterfowl, which become ever more concentrated on the waning number of wetlands. For example, avian cholera at times kills thousands of waterfowl concentrated on small wetlands, including those on wildlife refuges. (This disease is not related to human cholera, nor does it affect humans.)

Diseases also may cause serious losses in already small populations of endangered species. An epizootic of canine distemper in Wyoming once decimated the only colony of black-footed ferrets then known to exist. Before the epizootic, the population consisted of 59 ferrets, but only six were located afterward. Likewise, a disease, believed to be a virus, once killed 18 percent of the whooping cranes held as part of a captive breeding program. A mysterious disease that attacks the myelin sheath surrounding nerves in the central nervous system killed 29 bald eagles at a man-made lake in Arkansas and another 26 two years later. In the following years, at least 86 eagles died at other reservoirs in five Southern states, along with other species including waterfowl and great horned owls.

EFFECTS ON MANAGEMENT

Finally, diseases are part of the full spectrum of issues facing wildlife managers and remain as much a part of the management puzzle as food habits, population dynamics and habitat requirements. In fact, diseases are often related directly to each of these topics. For example, parasites in the rumen of white-tailed deer may offer managers a means of estimating the health of deer herds. The intensity of these infections theoretically varies with the density of the herd in relation to carrying capacity, and therefore counts of the parasites present an "early warning signal" for detecting over-populated deer herds.

Diseases may weaken wildlife to the point that infected animals are predisposed to predator attacks. This relationship is illustrated in the well-studied moose herd at Isle Royale, a national park at Lake Superior, where biologists determined that nearly one-third of the adult moose killed by wolves suffered from a mandibular inflammation known as lumpy jaw. Moreover, moose are susceptible to tapeworm infections that cause golf-ball-size cysts in their lungs. Fully two-thirds of the herd may be infected. Because the infections are initiated when moose consume forage or

drink water contaminated with tapeworm eggs, older moose are steadily debilitated by ever-increasing lung infections and become better targets for wolf attacks.

New diseases continue to emerge. A mysterious bacterial disease struck gopher tortoises in Florida, destroying the cell structure of their upper respiratory tracts and soon reducing the population by 20 to 30 percent. The tortoises are a keystone species in the sandy uplands, where their burrows provide shelter for hundreds of other species, including three on Florida's protected list. Bats, too, are dying in large numbers at locations in New York and adjacent states. The calamity known as white nose syndrome for the spots of fungus appearing on the bodies of infected individuals has already killed 90 percent of the bats wintering in some caves and mines. The fungus seems to be a secondary symptom, with the underlying pathogen still unknown. The disease may prove a disaster, not only for the bats but because of a potential explosion of insect pests they control.

An icon of Australian wildlife, the Tasmanian devil, is currently experiencing an epizootic of hideous facial tumors that ultimately kill their victims. Officials estimate that the facial tumor disease has claimed up to 50 percent of the population, with the remainder declared endangered in 2008. Unlike other cancers, the pathogen is contagious and apparently spreads when an infected animal bites another. While biologists struggle with ending the epizootic, a disease-free population of 200 Tasmanian devils has been quarantined to assure survival of the species.

Clearly, much remains to be learned about wildlife diseases and the ways they might be controlled. In the jet age, pathogens may spread worldwide in a matter of days, unfortunately assisted at times by the illegal pet trade, livestock and poultry operations, exotic introductions and, perhaps most of all, diminishing habitat conditions. Moreover, changing climatic patterns—mainly in temperature and precipitation regimes—almost certainly will enhance the spread of diseases, especially those whose transmission depends on mosquitoes and other arthropod vectors. Whatever the case may be—rabies, avian flu or a threat just emerging—diseases remain an ongoing challenge for wildlife management. ◆

Eric Bolen is an emeritus professor of biology at UNC Wilmington.

continued from page 29

whereas red foxes, of Old World origin, have greater resistance. The disease, which attacks the respiratory, gastrointestinal and central nervous systems, also affects raccoons, which often recover and thereafter serve as a reservoir for the virus.

Waterfowl and shorebirds are reservoirs for the viruses causing avian influenza, but these birds rarely acquire the disease unless infected by highly pathogenic strains from poultry. Commission biologists are currently engaged with the U.S. Department of Agriculture in a national surveillance program designed to detect the highly pathogenic form that attacks humans. Health experts fear that an influenza pandemic could result if this form should mutate and become transmissible from human to human. Fortunately, after two years of surveillance, the pathogenic form has not been detected in wild birds in North Carolina or anywhere else in North America.

Botulism, a paralytic condition, regularly strikes waterfowl in North Carolina, especially in the Piedmont, but the outbreaks generally produce fewer than 250 fatalities, far fewer than the massive epizootics common to some locations in the United States. When botulism strikes, commission staff pick up and dispose of the dead birds as a primary means of halting the outbreak.

MELISSA McGAW/NCWRC

MELISSA McGAW/NCWRC

N.C. Wildlife Resources Commission biologists are working on a national surveillance program of waterfowl to detect avian influenza.

Duck virus enteritis (DVE, also known as duck plague) is a particularly virulent disease of waterfowl that does not affect other species, including humans. Whereas only two significant epizootics have occurred in North America, each of these nonetheless resulted in thousands of mortalities. Because DVE persists in captive flocks, the commission initiated a project for monitoring the disease in wild waterfowl in North Carolina. After three years of study, DVE was detected at an extremely low rate of prevalence and in only a few species (e.g., blue-winged teal are far more susceptible than pintails). The commission continues to investigate any waterfowl die-offs, particularly those involving captive birds, for indications of DVE.

The commission maintains ongoing vigilance for epizootics in both resident and migratory wildlife. When mortality occurs, samples are collected and sent to the Southeastern Cooperative Wildlife Disease Study or other laboratories for identification of the pathogen. Whereas commission biologists remain actively engaged in routine monitoring programs, they also rely on surveillance by hunters and the general public to report suspicious mortalities of wildlife.

—*Eric G. Bolen*

Wildlife Commission biologists Doug Howell and Perry Sumner made important contributions to much of the material presented here.

What is the perfect food?
Adults of different animal species would select different foods.
All baby mammals, however, would make the same choice:

Mother's Milk

written by Roger Powell
illustrated by Consie Powell / nature activity by Anne M. Runyon

DEER MOUSE AND YOUNG

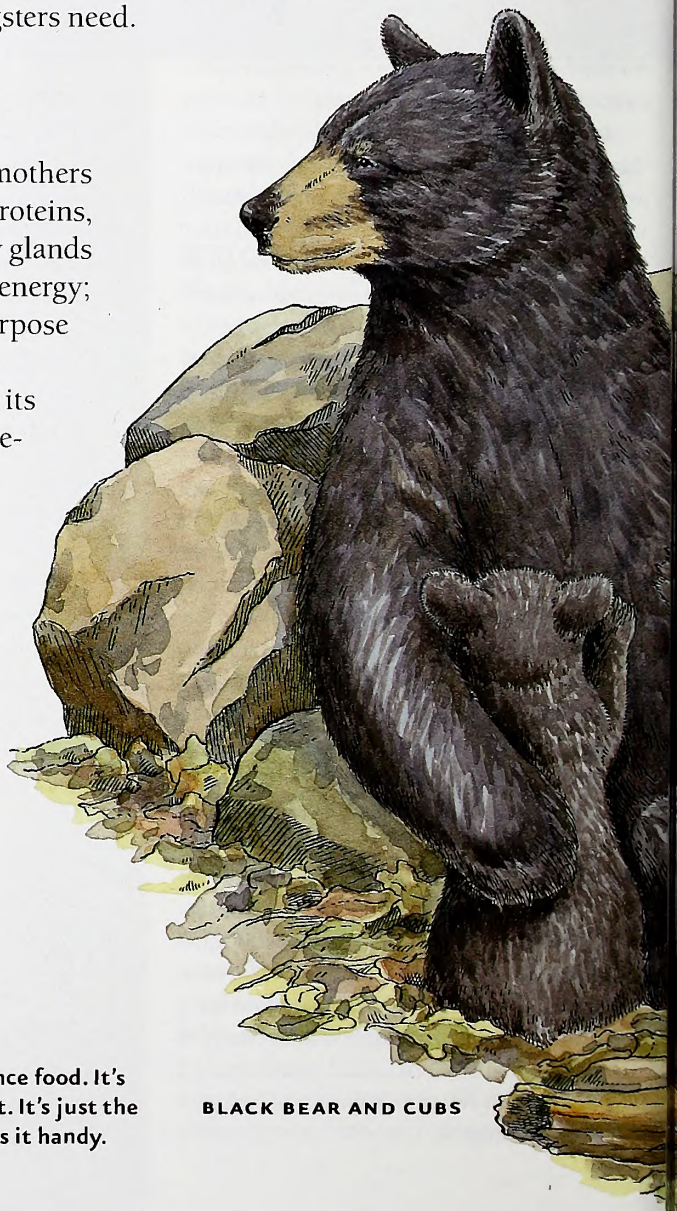
Why is mother's milk so perfect? It's perfect because each mother mammal formulates her milk to be exactly what her youngsters need.

WHAT IS MILK?

Actually, no single "milk" exists because the milks made by mothers of different species differ. All milks are complex mixtures of proteins, sugars, fats and water and are produced only in the mammary glands of mammals. Proteins are needed for growth; fats are rich in energy; sugars produce energy that can be used quickly. The sole purpose of all milks is to nourish young.

The milk of each species is exactly suited to the needs of its young. Baby whales and seals need to grow fast and nurse infrequently, so the milks their mothers make are thick and high in fat. Young deer, horses and porcupines begin eating solid food shortly after they are born and do not need rich milk. Young rabbits nurse only once or twice a day, so the milk their mothers make is rich like that of whales.

The milk a mother makes for her youngsters changes over time. Colostrum, the milk produced immediately after a mammal is born, is a protein-rich milk that also carries antibodies from the mother's body to help her newborn offspring ward off disease. After the period when colostrum is produced, the fat content of milk rises. And as a young mammal grows, its mother's milk changes to match the changing needs of the youngsters.



Mother's milk is the original convenience food. It's always ready whenever Junior wants it. It's just the right temperature and Mom always has it handy.

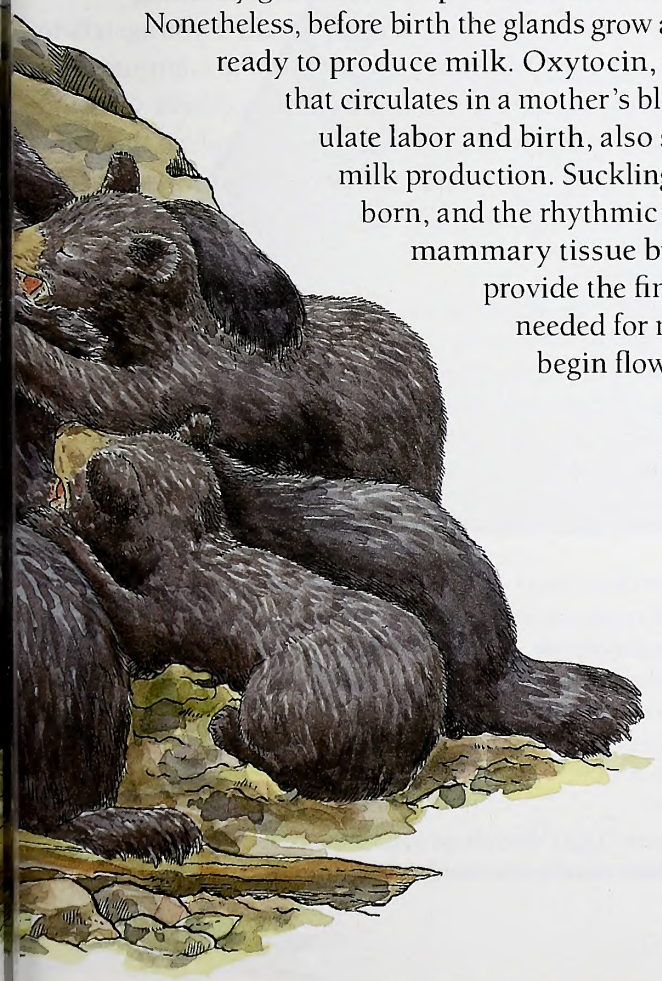
BLACK BEAR AND CUBS

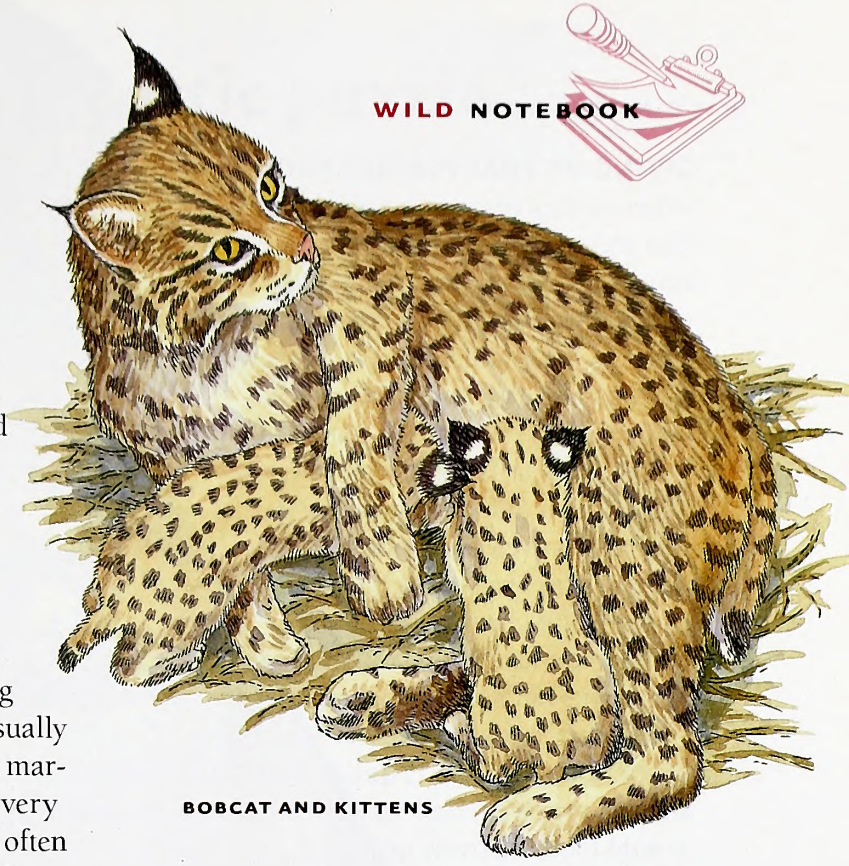
MAGNIFICENT MAMMARY GLANDS

Mammals have many types of glands in their skin. Glands are dead-end tunnels lined with cells that produce substances that travel to the skin surface; most are simple tubes. Some produce oils to keep hair healthy and water-repellent. Others produce fluids with complex odors used for communication. Still others produce copious fluids used for cooling. Mammary glands are complex and have many branching tubes with milk-producing cells.

Mammary glands are located only on the chests and abdomens of mammals. They release milk through mammae, the teats or nipples that young mammals suckle. The number of teats on a mammal usually corresponds to the largest litter size for its species. In placental mammals (those mammals that nourish young for relatively long periods before birth with a complex placenta) teats are usually in lines, paired on each side of the chest and abdomen. In marsupials, (those mammals that nourish young for only a very short period before birth with a simple placenta) teats are often in a U shape, still paired, with a single teat in the middle. Egg-laying mammals (platypuses and echidnas) do not have teats but, instead, have patches of skin where milk oozes to the surface.

Mammary glands do not produce milk until birth. Nonetheless, before birth the glands grow and become ready to produce milk. Oxytocin, a hormone that circulates in a mother's blood to stimulate labor and birth, also stimulates milk production. Suckling by a newborn, and the rhythmic butting of mammary tissue by its head, provide the final stimulus needed for milk to begin flowing.





BOBCAT AND KITTENS

NURSING, SUCKLING, ENJOYING

Tongues of newborn mammals are broad, flexible and shaped to wrap around a teat or nipple, facilitating nursing. Many mammals are born without teeth, so teeth do not get in their way while suckling. Other mammals are born with teeth, however, but those teeth still do not get in the way. A baby porcupine, with large, protruding incisor teeth right up front, in its mouth, simply nurses on one side or the other of those incisors. As baby mammals grow and nursing becomes less important, their tongues change to become better at moving solid food around in their mouths.

Mammals that begin eating solid food at young ages do not nurse for as long as mammals that depend solely on milk for a long time. They grow teeth at young ages to handle solid food and they wean early.

Apart from most humans, mammals lose the ability to digest lactose, which is milk sugar. After they are weaned, most mammals stop producing lactase, the enzyme that breaks down lactose and makes milk's energy and nutrition available. Once the ability to produce lactase is lost, a mammal never drinks mother's milk again. Indeed, because it can not digest lactose, drinking milk cannot provide nutrition and can actually make a mammal sick.

GIVING UP THAT PERFECT FOOD

When young mammals mature enough that they no longer need milk for nourishment, they stop drinking milk. This is called weaning. For most mammals, weaning is a gradual process; a youngster eats more and more of the solid foods that its mother eats and drinks less and less milk. Sometimes weaning is drawn out; deer, porcupines, coyotes, wolves and bobcats are weaned over long periods of time. Young wolves begin to gnaw on bones and meat when younger than two weeks old but are not weaned for another six weeks or so. And sometimes the period of change is quick. Most rodents depend almost entirely on milk until weaning and then switch to wild food relatively quickly.

RED WOLF AND PUPS

Weaning is not universally directed only by a young mammal or only by its mother, and sometimes parent and offspring disagree about whether weaning time has come. Some young mammals eat gradually more wild food and nurse gradually less on their own accord. Weaning of young by themselves occurs most frequently when wild foods are abundant and nutritious. Some mother mammals restrict the nursing of their offspring, forcing the youngsters to find wild foods on their own. Weaning of youngsters by their mothers occurs most often when wild foods are in short supply. At these times, mothers have trouble finding enough food for themselves, let alone enough food to produce all the milk that a growing youngster wants to drink.

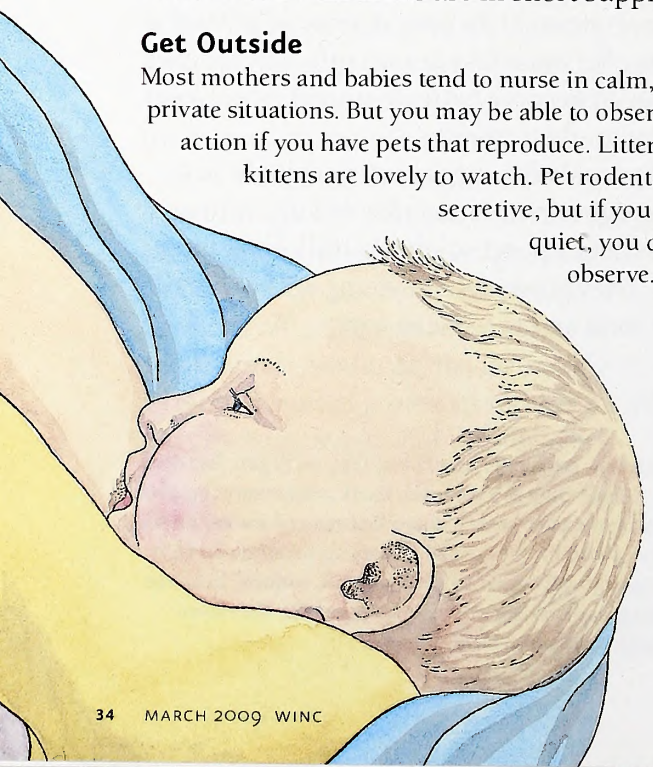
Even when mothers encourage their youngsters to stop nursing, youngsters usually want to continue. They try to nurse and are repelled by their mothers. Constant pestering might yield an occasional meal, so the young keep trying. Ultimately, however, all youngsters are weaned and turn to solid foods for all of their nutrition.

Get Outside

Most mothers and babies tend to nurse in calm, cozy and often private situations. But you may be able to observe nursing in action if you have pets that reproduce. Litters of puppies or kittens are lovely to watch. Pet rodents may be more secretive, but if you are calm and quiet, you can usually observe. If there is a newborn baby in your family who is being breastfed, sit quietly to be part of the cozy mealtime.

Visit a farm to watch pigs, goats, calves or foals nurse; you might even see them doing so as you drive by a pasture.

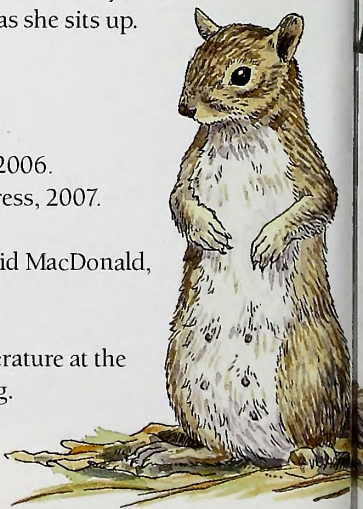
Notice squirrels in your yard; you can tell if a female has youngsters hidden away somewhere, because you will see the swollen teats on her chest as she sits up.



Read and Find Out

- "Little Lost Bat" by Sandra Markle, Charlesbridge, 2006.
- "Mama's Milk" by Michael Elsohn Ross, Tricycle Press, 2007.
- "Mama Mama" by Jean Marzollo, Harper, 2000.
- "The New Encyclopedia of Mammals" edited by David MacDonald, Oxford University Press, 2001.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

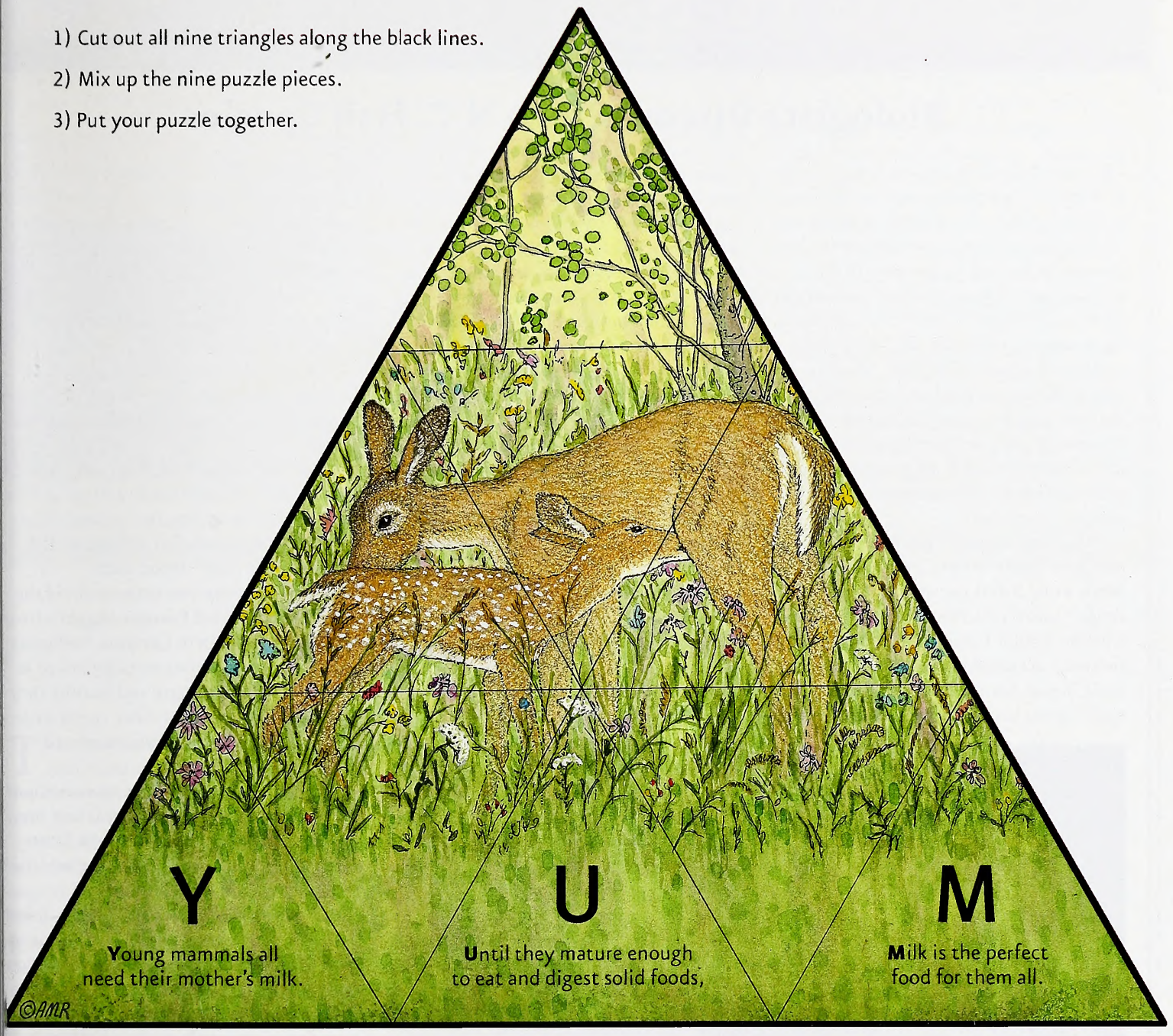


YUM! Milk, an acrostic puzzle

1) Cut out all nine triangles along the black lines.

2) Mix up the nine puzzle pieces.

3) Put your puzzle together.



Mammals nurse in many positions. Fawns and foals nurse standing up. Young mice nurse curled up with their mothers, while wolf pups nurse either way. Mother bears slouch back against a log or rock and often drape a foreleg over their cubs as they nurse. For all mammals, the close contact between mother and offspring forges a strong bond.

This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational use.

Biologists Discover New N.C. Fish Species

A federally endangered fish thought to live only in Virginia was recently discovered in North Carolina. The Roanoke logperch, one of the largest darters in the perch family, was thought to live only in portions of the Roanoke and Chowan river basins of Virginia. However, biologists with the N.C. Wildlife Resources Commission, the N.C. Division of Water Quality and the N.C. Museum of Natural Sciences found two populations of the fish in the Mayo and Smith rivers in the summer of 2008—discoveries that sent ripples of excitement through biologists who are more likely to see fish disappear than reappear in a river basin.

"In a time when we're seeing a major decline in aquatic critters, we get really excited when a rare fish is possibly expanding its range," said Chris Wood, aquatic biologist with the Wildlife Commission. "We think this fish once occurred in most of the Roanoke and Chowan basins of both North Carolina and Virginia but has declined over the past century. "What we think we see now is a remnant of the fish's original distribution."

The search for the Roanoke logperch started by accident in 2007 after Duke Power biologists happened upon a lone specimen while sampling the Dan River, just downstream of the Smith River, near Eden. Another sampling effort later in 2007 produced only one more specimen, leading biologists to hypothesize that both fish were either washed downstream from Virginia's Smith River population during a previous high-flow event or that drought conditions may have caused the two fish to move downstream.

"The discoveries left us with two unanswered questions: Where did these two fish come from? And could there actually be a reproducing population of the Roanoke logperch in North Carolina?" Wood said. "Further surveys were needed to scratch that scientific itch."

That itch was scratched in the most exciting way possible in early July when biologists found not one but two populations of Roanoke logperches. On July 8, they captured three logperches while surveying a short reach in the Mayo River, a large tributary of the Dan River in Rockingham County. The three fish were exciting finds because no records existed of the fish in either the Virginia or North Carolina portions of the Mayo River.

A few weeks later, biologists found 10 Roanoke logperches in the Smith River in Rockingham County, ranging in size from 2.5 inches to 7 inches.

"The size range of the fish found in the Smith River indicates that several age classes exist, which means that there is most likely a reproducing population of Roanoke logperches in the river," Wood said.

Now that at least two populations of the federally endangered Roanoke logperch have been verified in North Carolina, biologists will look closely at the two populations to determine how extensive and healthy they are. They'll also look at other rivers with similar habitat for more undiscovered Roanoke logperches.

Garnering as much information as possible about these populations and their preferred habitat will aid biologists in future management decisions and help guide the restoration of this rare fish.

"Usually when we study a federally listed animal we are 'chasing a ghost' by going to areas where the animal once occurred but now is missing or extremely hard to find," Wood said. "Finding a new population, and in this case, two, is extremely exciting because it means there are more of that species than we thought, and maybe the conservation efforts at the state and federal levels are paying off.

"Our priority goal for all federally endangered species is to get them off the list through restoring their populations."

For more information on the Roanoke logperch or other nongame aquatic wildlife, call the Division of Inland Fisheries at (919) 707-0220.

NCWRC

Deer and Gear on Display at Dixie Deer Classic

The Dixie Deer Classic, one of the most popular outdoor shows in North Carolina, will be held March 6–8 at the N.C. State Fairgrounds in Raleigh. The Wake County Wildlife Club, which runs the show, will have trophy competitions in 12 categories. All the entries will be scored by the Boone & Crockett method, and scoring officials from both Boone & Crockett and Pope & Young will be present.

MELISSA McGAW / NCWRC

One trophy whitetail will be scored free with the purchase of show admission ($10 for anyone 13 and older). Competition entry closes at 6 p.m. on Saturday, March 7. Awards will be presented on Sunday at 4 p.m. N.C. Wildlife Resources Commission biologists also will be on hand to age deer jaws.

Among the seminars being offered this year will be a Quality Deer Management Association presentation, "The Future of White-tailed Deer Management." Among the speakers will be Joe Hamilton, QDMA's Southeastern Director of Education; Richard Lancia, Alumni Distinguished Professor at N.C. State; Chris Moorman, Coordinator of Fisheries and Wildlife at N.C. State; Mark Connor, manager of Chesapeake Farms; and Scott S. Bebb, Ft. Bragg biologist. The keynote address, "The Future Direction of Wildlife in North Carolina," will be given by N.C. Wildlife Resources Commission executive director Gordon Myers. Call (919) 552-9449 or email ncqdma@yahoo.com to reserve a seat.

Also, approximately 200 exhibitors will be on hand to display the latest in hunting and outdoor equipment. For more information, please contact the Wake County Wildlife Club at (919) 782-5333 or visit www.dixiedeerclassic.org.

NOAA Postpones Federal Saltwater Registry

The National Oceanic and Atmospheric Administration (NOAA) has delayed implementation of a saltwater angler registry until Jan. 1, 2010.

NOAA had originally proposed that registration for the nation's 15 million saltwater anglers be required beginning Jan. 1, 2009, but based on public input decided to give states another year to put in place their own data collection systems.

North Carolina saltwater fishermen likely will be exempt from registering because the state's Coastal Recreational Fishing License provides much the same information as the federal registry would require.

If anglers are not licensed or registered by a state that has been exempted and want to fish in federal waters, they will be required to register with NOAA. They also must register if they fish in tidal waters for migratory fish such as striped bass and salmon that spawn in rivers and spend their adult lives in estuaries and oceans. However, those who fish recreationally for these migratory species inland of tidal waters need not register, according to the final rule.

Federal saltwater angler registrations will include an angler's name, date of birth, address, telephone number, and the regions where they intend to fish. This information will be used by NOAA to conduct surveys on fishing effort and amounts of fish caught. Once anglers have registered, they may fish anywhere in U.S. federal waters, or in tidal waters for anadromous species, regardless of the region or regions they specified in their registration. The registration will be valid for one year from its date of issue. Anglers must comply with applicable state licensing requirements when fishing in state waters.

Saltwater anglers will be able to register online or by calling a toll-free telephone number that will be publicized, and will receive a registration certificate. Anglers will need to carry this certificate (or their state license from an exempt state) and show it to an authorized enforcement officer if requested. No fee will be charged in 2010. An estimated fee of $15 to $25 per angler will be charged starting in 2011.

Anglers who fish only on licensed party, charter or guide boats would not be required to register with NOAA since these vessels are surveyed separately from angler surveys. Those who hold angler permits to fish for highly migratory species, such as tunas or swordfish, and those fishing under commercial fishing licenses will also be exempt. Anglers registered or permitted to fish in a formal state or federal subsistence fishery will also be exempt, as will anglers under 16.

CALENDAR OF EVENTS

Friday, Feb. 6–Sunday April 19

View winning photos from four years of the *Wildlife in North Carolina* Photo Competition in a special exhibition at the N.C. Museum of Natural Sciences in Raleigh. The free exhibition includes all winners from the 2008 competition, as well as grand prize winners and first-place photos in all categories from 2005, 2006 and 2007.
Visit www.naturalsciences.com.

Saturday, March 7

Enjoy a traditional five-course hunt club dinner and experience the sporting heritage of Currituck County inside the private, working hunt club at Pine Island near Corolla. Auction to benefit the preservation of the Whalehead Club follows. Admission is $250 per person. Contact (252) 453-9040, ext. 3, for more details.

Saturday, March 14

Learn about saltwater fishing at the third annual Get Hooked Fishing School at the N.C. Aquarium at Pine Knoll Shores. Registration fee for the one-day event is $50. Contact Pam Pittman at (252) 247-4003 to register.

Saturday–Sunday, March 21–22

Test your fly-fishing skills at the second annual Pisgah Fly Masters tournament on the Davidson River near Brevard. Registration is open to the first 125 entrants. Fee prior to March 3 is $50; after that date, $75. Proceeds benefit the Pisgah Center for Wildlife Education. Contact (828) 877-4423 or e-mail emilie.johnson@ncwildlife.org.

Check out hunting and fishing exhibits, wildlife art displays, decoys and boats at the Cape Fear Wildlife Expo at the Schwartz Center and Coastline Convention Center in Wilmington.
Visit www.capefearwildlifeexpo.com.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

IN SEASON

This month, this season is open in North Carolina:

Roanoke River Striped Bass Management Area: March 1–April 30 unless closed by proclamation. (See the regulations digest for waters included in management area.)

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

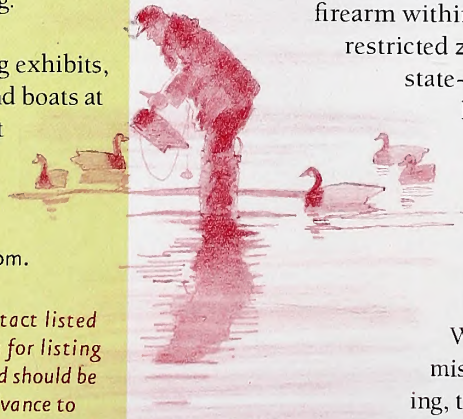
Check the *2008–2009 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Concealed Carry Not Always An Exemption

The announcement that concealed firearms will be allowed in some national parks and wildlife refuges has prompted questions about what is allowed at areas held by the N.C. Wildlife Resources Commission, including game lands.

The Interior Department issued a rule on Dec. 5 that allows an individual to carry a concealed firearm if the person has a concealed carry permit, and if the state where the national park or federal wildlife refuge is located also allows it. This is a federal ruling for national parks and should not to be confused with state parks, state forests and state recreational properties, such as game lands.

Loaded firearms are prohibited at the N.C. Wildlife Resources Commission's public access areas (boat ramps) and public fishing areas. This includes handguns, regardless of a concealed carry permit. It is also unlawful to possess a loaded firearm within a posted restricted zone on any state-owned fish hatchery.



In North Carolina, more than 2 million acres are maintained by the Wildlife Commission for hunting, trapping and fishing as game lands. Concealed firearms are allowed on game lands only when doing so coincides with a firearm hunting season and the concealed firearm is of a caliber allowed for hunting under game land rules. During closed hunting season for game animals and trapping seasons, only handguns limited to .22 caliber with a barrel length not greater than seven and a half inches, firing short, long or long-rifle ammunition, are allowed.

"The bottom line is, concealed carry permits do not supersede the other regulations that apply," said Maj. Keith Templeton, supervising officer for field operations of the Wildlife Commission's Enforcement Division. "That includes game lands. It is up to the permit holder to know the law and obey it. If anyone has a question about concealed carry privileges in those situations, they should call a local wildlife officer or (919) 707-0030."

In much of the state, it is illegal between a half-hour after sunset and a half-hour before sunrise to intentionally shine a light on deer or in search of deer. Six counties had no local light laws as of Jan. 1, 2008. In those counties where shining a light at deer is not prohibited, it is always unlawful to be in possession of any firearm, including a concealed firearm with permit, while shining a light upon deer.

Hunter responsibility and ethics are taught as part of the free statewide hunter education program, required for first-time hunting license buyers. For more information, call (919) 707-0030.

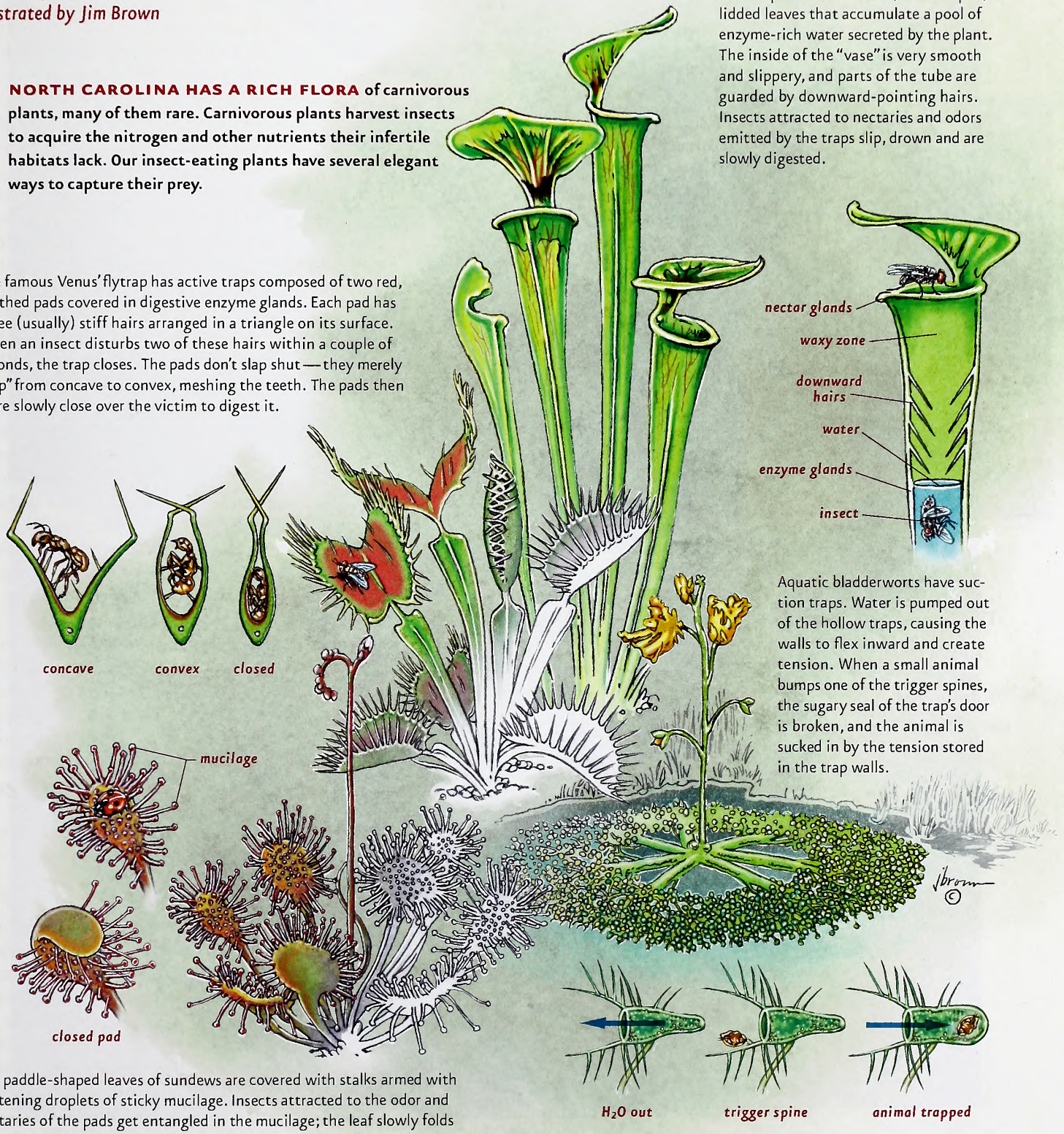
How Do Carnivorous Plants Capture Prey?

written by Clyde Sorenson
illustrated by Jim Brown

NORTH CAROLINA HAS A RICH FLORA of carnivorous plants, many of them rare. Carnivorous plants harvest insects to acquire the nitrogen and other nutrients their infertile habitats lack. Our insect-eating plants have several elegant ways to capture their prey.

Pitcher plants have hollow, vase-shaped, lidded leaves that accumulate a pool of enzyme-rich water secreted by the plant. The inside of the "vase" is very smooth and slippery, and parts of the tube are guarded by downward-pointing hairs. Insects attracted to nectaries and odors emitted by the traps slip, drown and are slowly digested.

The famous Venus' flytrap has active traps composed of two red, toothed pads covered in digestive enzyme glands. Each pad has three (usually) stiff hairs arranged in a triangle on its surface. When an insect disturbs two of these hairs within a couple of seconds, the trap closes. The pads don't slap shut — they merely "pop" from concave to convex, meshing the teeth. The pads then more slowly close over the victim to digest it.



Aquatic bladderworts have suction traps. Water is pumped out of the hollow traps, causing the walls to flex inward and create tension. When a small animal bumps one of the trigger spines, the sugary seal of the trap's door is broken, and the animal is sucked in by the tension stored in the trap walls.

The paddle-shaped leaves of sundews are covered with stalks armed with glistening droplets of sticky mucilage. Insects attracted to the odor and nectaries of the pads get entangled in the mucilage; the leaf slowly folds over the trapped victim to finish the meal.

A Fish Named Jack

written by Jim Dean

It's been a good many years ago, but I'll bet Phil Cable hasn't forgotten this. We were fishing a pond at my family's farm and had caught several decent bass. After probing the deeper water along the dam, we came to the corner where a large oak had fallen in, its limbs creating a tangle of cover. Phil pitched his spinnerbait past the limbs and began an erratic retrieve. I could see the gold flick of the blade in the dark water, then something big grabbed it.

JIM DEAN

Phil set the hook hard, and the water surged as though a submarine had kicked right rudder, full speed. Almost instantly, the sub was in the air in a tail-over-teacup cartwheel, and Phil ducked instinctively as the gold blade sailed past his ear. It all happened so quickly that the boat was still rocking in the backwash before anyone could speak.

"Holy, what the, geez-u-whiz..." Phil stammered. Loose monofilament was coiled over his head, and when he reeled it up, the heavy wire shaft connecting the blade to the hook had been snapped, leaving a little wire pigtail.

"Wow, that was the biggest pickerel I've ever seen in here," I said, my voice quivering. "Must have been at least 5 pounds. Long as a yardstick."

Phil picked up his ruined lure and examined it. "Never had that happen," he said in amazement.

"Well, you know pickerel have a reputation as really poor fighters," I noted.

"Yeah, so I've heard," said Phil, sighing.

So we'd both heard, and many times, too. But we already knew better, and so does any angler who tangles with chain pickerel on a regular basis. Phil is one of the best bass fishermen and guides I know—he released a 14-pound, 8-ounce largemouth he caught in a tournament on Jordan Lake some years ago—and while he loves his bass, you won't hear him say pickerel are pushovers.

I was about 8 years old when I caught my first pickerel while fishing with my grandfather, and I was so impressed that I have specifically targeted these handsome marauders many times since. I still don't understand why the pickerel isn't a major game fish. True, 9 pounds is about tops for these fish, and they make a bony meal. They can also be notoriously hard to catch at times, but that's true of many species that are more widely appreciated.

"They sometimes conserve their energy when hooked until they see the boat or net, and then go berserk and tear up your tackle."

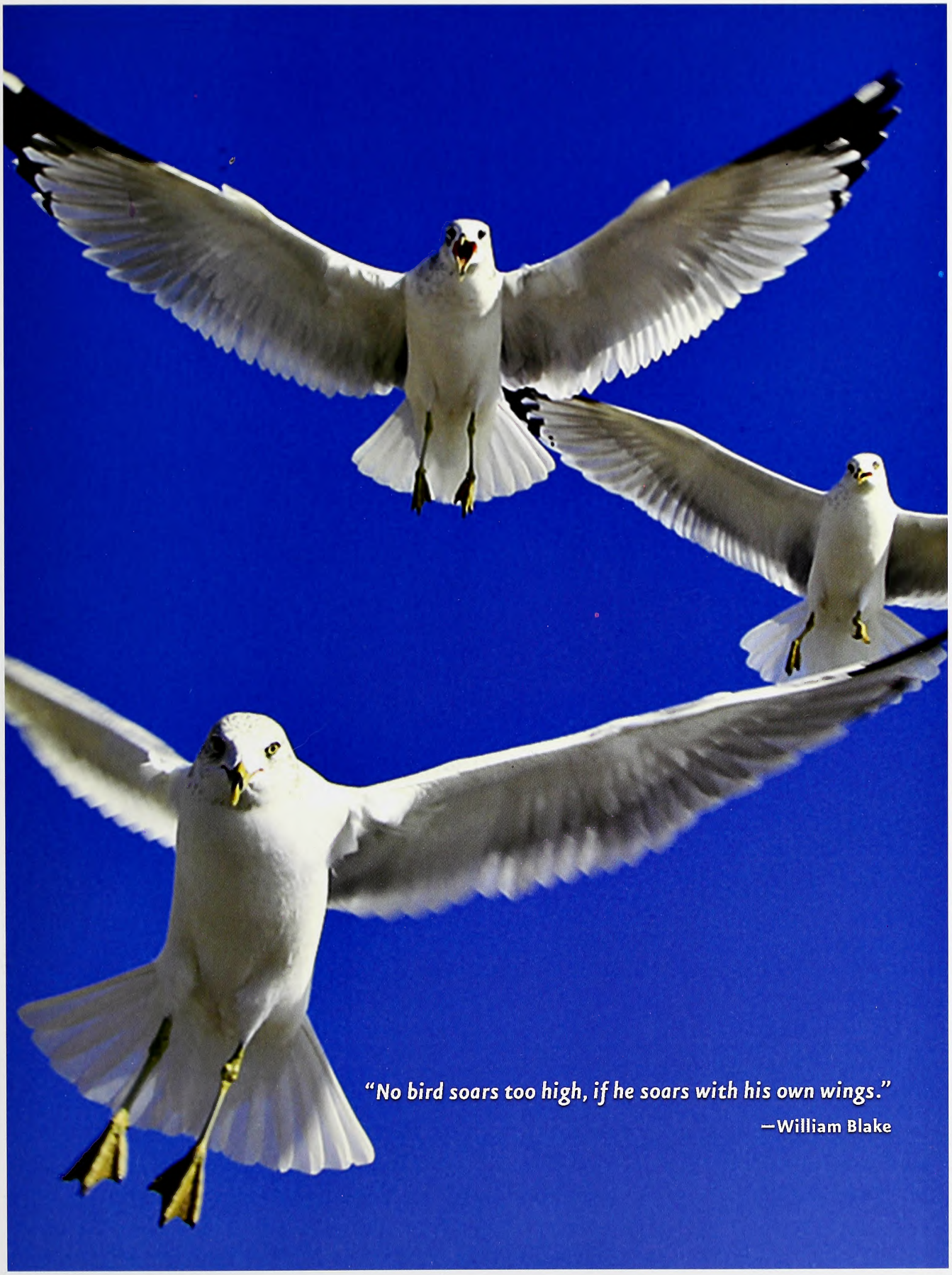
So what's not to like? Surely it's not attitude. If the largemouth is the biker of the pro-angling circuit, cradling a pot-belly over a chromed-out Harley with straight pipes, the pickerel is a jungle sniper, camouflaged in viridian and black, stalking prey with deadly stealth. Both take violent exception to interrupted dinner plans. The bad rap on pickerel is that, unlike bass, they sometimes conserve their energy when hooked until they see the boat or net, and then go berserk and tear up your tackle. That strikes me as a hair-splitting distinction—like saying you'd rather be crushed under a slow-moving steamroller than shake hands with a suicide bomber. The fact is that there are lots of places where you can catch both bass and pickerel and make your own comparisons.

Chain pickerel, also called jacks, jackfish and hoe handles, are found in creeks, rivers and many lakes from the western Piedmont to the coast, and they are particularly common throughout the Coastal Plain in blackwater streams, millponds and brackish estuaries. Jim Simons and I used to fish specifically for pickerel in old millponds, and we had lots of exciting fishing. One advantage pickerel offer is that they are most active in late fall and early spring and, if you can stand the weather, they'll often feed throughout the winter when other angling opportunities are slim. Oddly, they are much harder to catch during the summer, even where they're abundant.

Our favorite artificial lures are spinnerbaits, but pickerel also like spoons and crankbaits. They prey mostly on small fish, so any lure that imitates a minnow is a good choice. I've also had good luck using a fly rod and streamers, and pickerel will occasionally nail topwater lures and bugs. Years ago, Ted Dossett and I had great sport with pickerel while wading Piedmont creeks using ultralight spinning tackle. A pickerel's sharp teeth can easily bite through monofilament, so you may want to add a short section of wire leader ahead of your lure.

When I built a new pond at the farm in 1986, I decided to see whether pickerel might fit into the mix. Biologists had told me that bass and pickerel might occupy different niches as noncompeting predators. Jack Avent and I caught six pickerel in nearby streams and added them to the bass and panfish already stocked. Those pickerel reproduced and some grew big (as Phil would attest). Unfortunately, we had to drain that pond, so we never learned whether pickerel could coexist in our pond without adverse effects.

But, dang, I miss those rambunctious jacks.

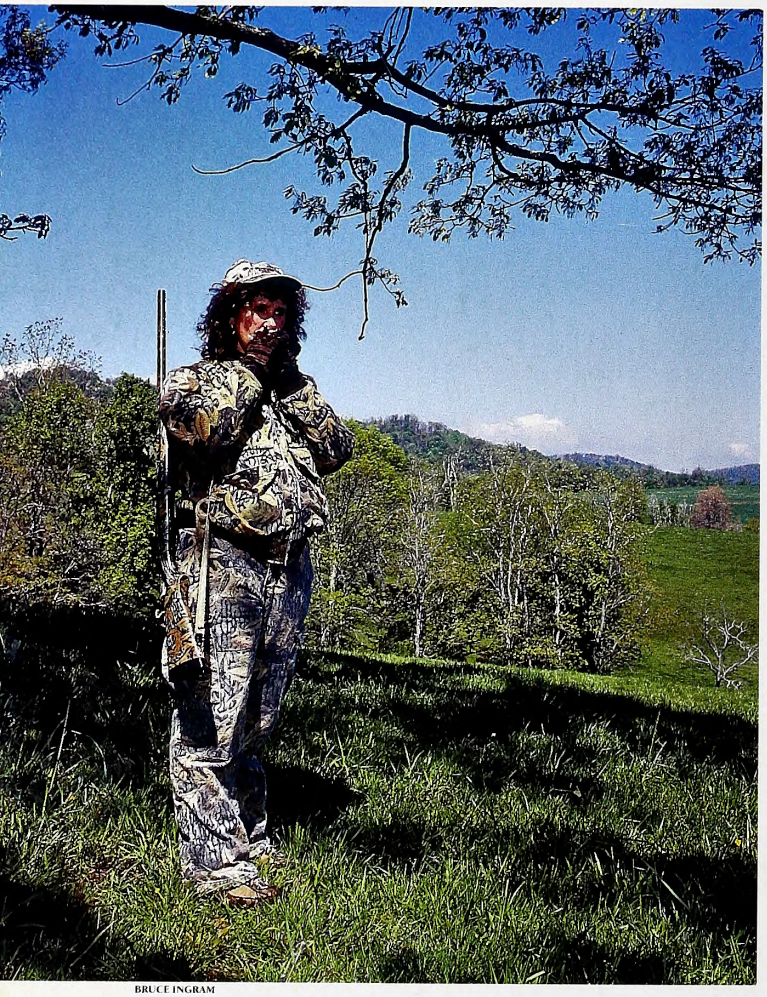


JENNY SCHOOLER

Gulls

OUTDOOR MOMENT

IN THE APRIL ISSUE



BRUCE INGRAM

GOBBLER PRIMER

Want to try spring turkey hunting but don't know how to get started? Try this guide for novice hunters.

CRAPPIES ON A FLY

The right conditions and a little experimentation with flies can result in a great day catching slabs.

OUCH!

When you are stung by an insect, you just know that it hurts. The Sting Pain Index tells you exactly how.

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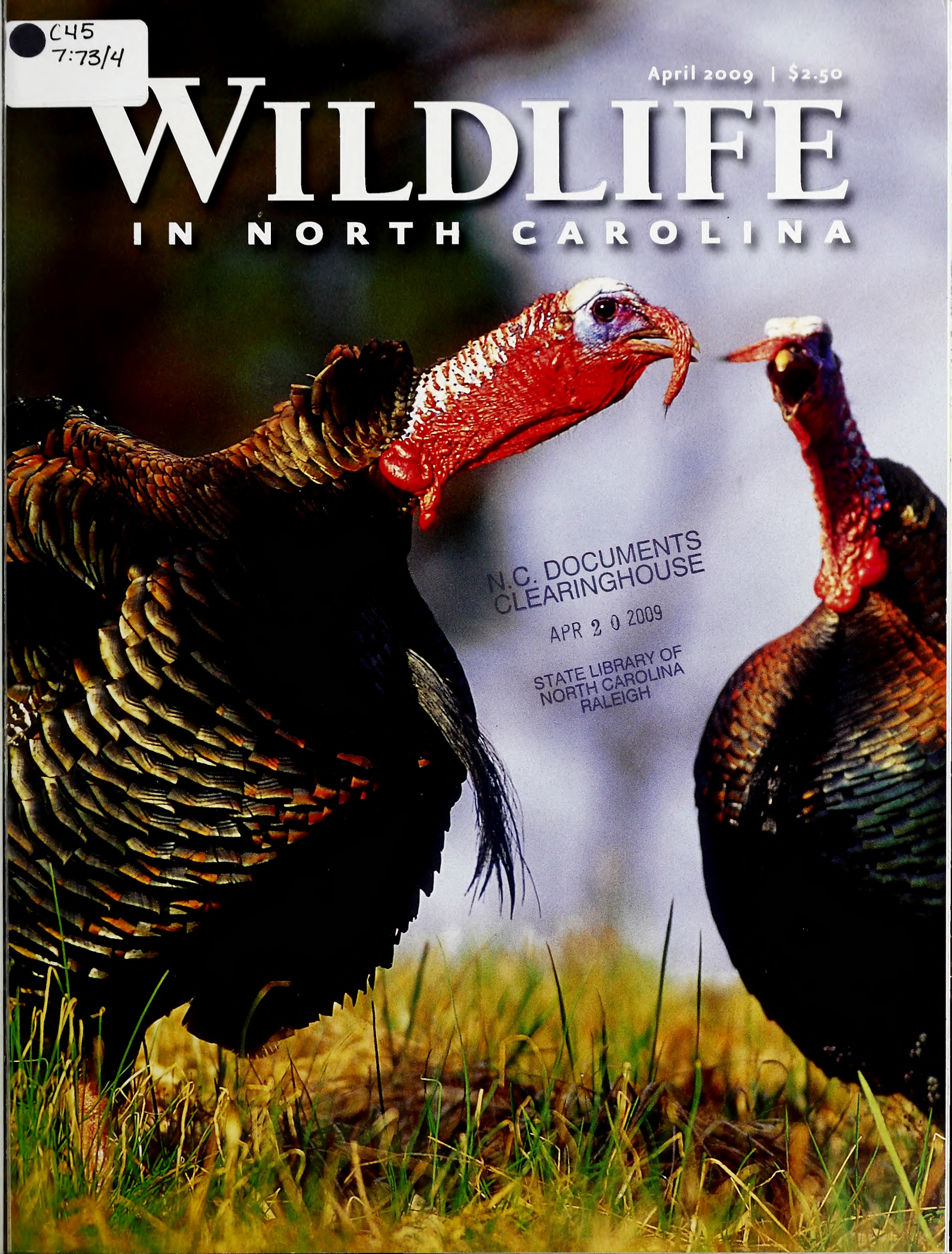

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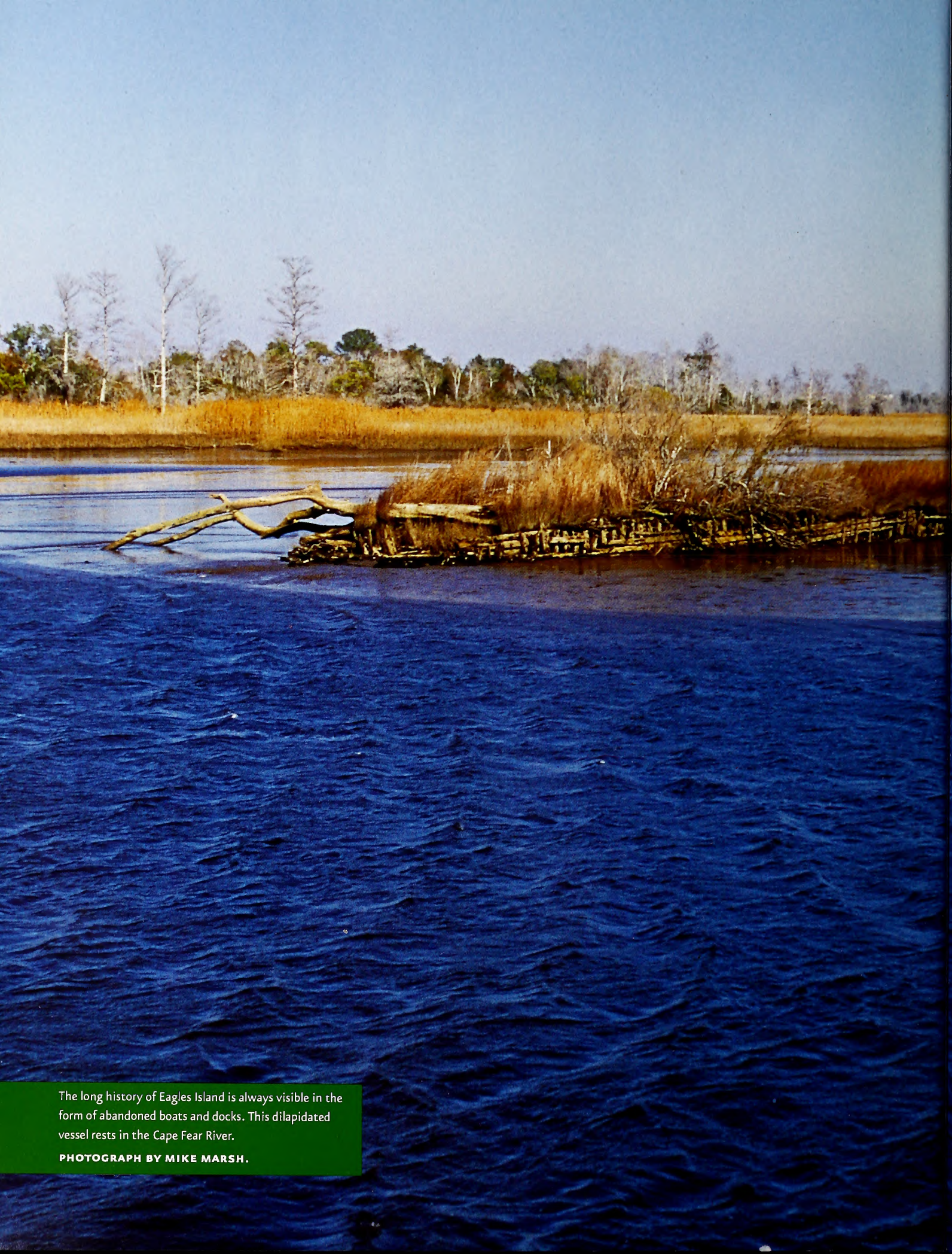
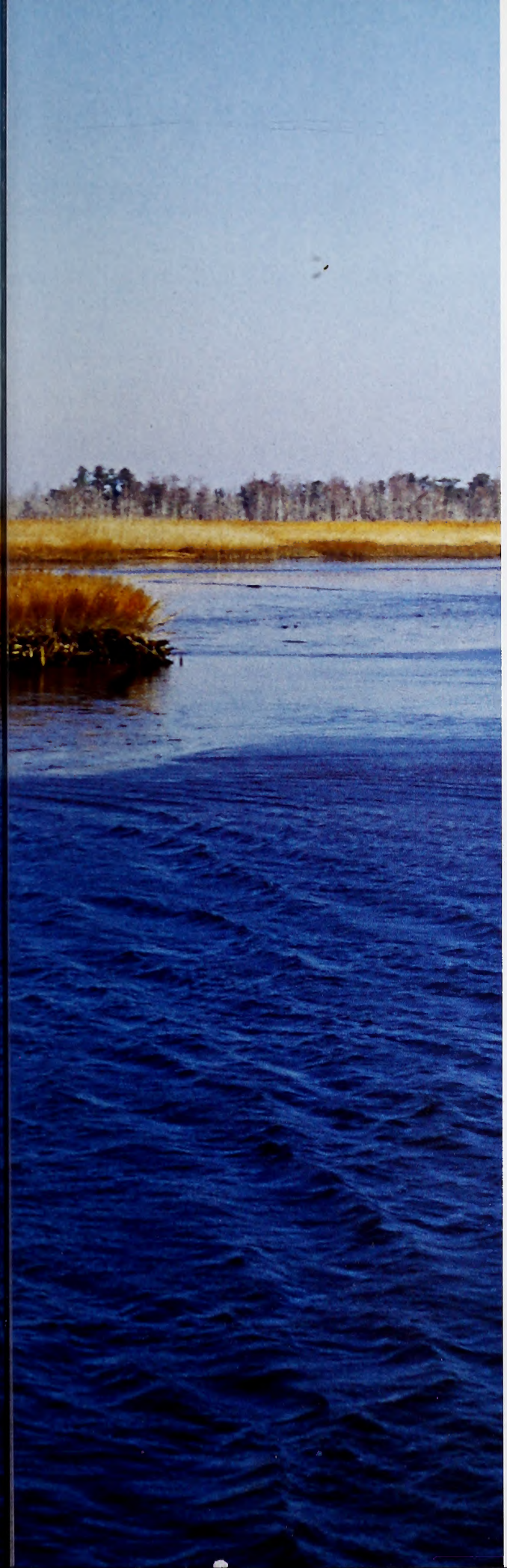


The long history of Eagles Island is always visible in the form of abandoned boats and docks. This dilapidated vessel rests in the Cape Fear River.

PHOTOGRAPH BY MIKE MARSH.



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Cover: In the spring, an Eastern wild turkey's thoughts turn to love. The trademark "gobble" vocalization gives the male of the species his common nickname. PHOTOGRAPH BY MASLOWSKI WILDLIFE PRODUCTIONS.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Bruce Ingram is a seriously sick dude. I mean that in the nicest way, of course. Bruce, whose stories you see here in the magazine several times a year, is a bona fide turkey hunting fanatic. He is addicted to the point that he pursues them in four states each year.

RUSSELL GRAVES

Bruce knew I was in need of a turkey-hunting mentor, so he invited me to join him on a gobbler expedition in Alleghany County last year. For two and a half days, we either sat very still or hiked around the large farm we had permission to hunt. Perhaps because the weather had been especially unstable—three days earlier it was in the 20s and snowing, but on our hunt temperatures reached 70 degrees—the turkeys were sitting tight. Even songbirds were sedate, possibly confused by the rapid transition from spring to winter and back.

Bruce taught me a lot on that trip. I learned how to use a box call, why gobblers respond to an owl call and what time turkeys come down from the roost. I also learned how difficult this type of hunting can become if you get caught in the wrong place when a gobbler appears suddenly.

The two of us had hiked a full circuit of the hilly cattle farm and were almost back to our original hunting spot overlooking a field. We were tromping up a steep, wooded hillside below the field when we heard a gobble. Realizing right away that we were in a pinch, we froze and hurriedly hatched a plan to get a shot at the bird.

While I waited below, Bruce crept up the hill in an attempt to see the turkey. We called a few times but could not get the bird to come closer. After about 30 minutes of hearing turkeys but not seeing any, the gobbler apparently got spooked and took off running. Opportunity blown, we set up in our original spot again and tried to entice him back into the field. No luck.

Months later, Bruce told me he had finally figured out what we should have done—he had been thinking about it the whole time. I told you he was sick. You can bet that Bruce will be back in the woods this month in search of gobblers. I hope that you will read his story "Gobblers for Beginners" on page 4 and join him on the quest for this magnificent, elusive game bird.

Greg Jenkins

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APRIL 2009 VOLUME 73, NUMBER 4

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The Complete Package

If I had to identify what I personally think *Wildlife in North Carolina* should look like, it would be the February 2009 issue. "Fearsome Flying Tiger of the Night" spotlights one of North Carolina's greatest species, the great horned owl. Every one of us will no doubt draw from "The Little-Known World of Crabs" on our next encounter along the coast. "Exploring a New Ecosystem" was an informative example of our state's amazing biodiversity and how, in many instances, one form of life is directly related to another.

As a backyard birder, "Providing Provisions" was close to my heart. "Stumpy's Return" reminded us of our own special close encounter with nature. And when I thought that would be all, "Fabulous Feathers" was a great educational piece on one of nature's great mysteries. The finale of "Count Your Backyard Birds" in Back Porch informed us about one of North Carolina's most participated annual events, the Great Backyard Bird Count. Our state is full of birders, as our count totals reveal each year. This reminder will help us maintain our high response.

Thanks to all responsible for my favorite issue! It is a tribute to your dedication to "the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them."

Ernie McLaney, Program Coordinator
Center for Sustainability
Central Piedmont Community College
Charlotte

Food, Feathers and Fun

F. Eugene Hester's article "Providing Provisions" was very thorough and informative, and hit home with many of us who really enjoy feeding birds in our back yards. I stumbled across a bird feeding food source this winter that my birds love, and I would like to share it. My hunting club has several large pecan trees in its yard. While I was waiting to head to my tree stand one afternoon, I watched a good variety of birds go to the ground to feed on pecans that had been cracked open by truck tires.

I picked up several dozen pecans, broke them all with a hammer and scattered them on the ground. After backing off to watch, I was amazed at all the birds that came to feed. bluebirds, titmice, chickadees, cardinals, chipping sparrows, white-breasted nuthatches, flickers, red-bellied woodpeckers, house finches, Carolina wrens and even Northern orioles came to feed on the crushed pecans.

This observation inspired me to pick up two five-gallon buckets full of pecans to take home. Later, I shelled out a couple of bags full of nearly whole pecans. I have a wire basket feeder usually used to provide peanuts that now is my pecan feeder. It is one of the favorites of the birds in my back yard.

Howard Vainright, Parks Coordinator
River Park North
Greenville

I enjoyed Eugene Hester's article in the February issue on feeding birds. I am surprised, though, that people have such a hard time dealing with squirrels. I've had several feeders of various types in my yard for many years, and never have a squirrel problem. I run a small wire between two trees or poles about 15 feet apart and suspend the feeders from the wire so that they hang perhaps 5 or 6 feet off the ground. That's low enough that you can reach them for filling, but high enough that a squirrel can't jump up from the ground. The important thing is to use small wire. Electric fence wire works fine because it's too small for the squirrels' feet to grip. I've never had a squirrel defeat this low-cost system, although it's amusing to watch them try! By the way, I put other food out for the squirrels — we don't want to leave them out altogether.

Julian Johnson
Raeford

Airborne and Errant

A number of readers wrote to inform us about inconsistencies with the bird photos in "Providing Provisions." The photo on page 24 identified as house finches and goldfinches is actually a group of pine siskins, which can be seen in our state during the winter. The dark-eyed junco on page 21 is a western variety often known as the "Oregon" junco. These birds can be found in North Carolina, albeit nowhere near as commonly as the "slate-colored" junco that abounds here.

Sandy Partin's comment in the story about neighborhood cats "taking care" of small rodents around her bird feeders, along with her wish that the cats would "take care" of thieving squirrels as well, was not an endorsement of this sentiment by the N.C. Wildlife Resources Commission. Domestic cats, both tame and feral, are significant predators of songbirds and small mammals. Cat owners should keep their pets inside at all times.

It should be noted in reference to February's Wild Notebook "Fabulous Feathers" that the Migratory Bird Treaty Act of 1918 made it illegal to possess parts of wild birds, including feathers. We recommend studying any feathers you find in the field and then leaving them where you found them.

Finally, the photo that was used on the back cover of the February issue with the promo for the redbreast sunfish story was of a pair of bluegills, not redbreasts. A slide labeling error identified the fish incorrectly, and their faded colors fooled us into thinking the ID was correct.

–Greg Jenkins

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters, Wildlife in North Carolina magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

Gobblers for BEGINNERS

For many reasons, it can be difficult to take up the sport of turkey hunting as an adult. These tips can help you get involved in this exciting type of hunting. written by Bruce Ingram

When my ancestors came to America from northern England in the 1700s, most of them settled in the three-state Piedmont region from Lancaster County, S.C., northward through the rolling foothills of North Carolina to Franklin County, Va. They generally practiced two trades: the reputable one of timber cutting and the disreputable one of moonshining.

Although making bootleg whiskey is an outside-oriented activity, my forebears did not engage in the noble outdoors pastime of hunting. And so it was that during the 1950s and 1960s as a boy growing up in the suburbs, I had no relative to instruct me on how to hunt and nowhere to strike out on my own even if I had had a mentor.

After years of wanting to begin hunting (especially to go after turkeys) and never going afield, I finally decided at the age of 33 to do so. Unfortunately, many of the people that I contacted refused to take me after turkeys. One acquaintance even told me that he did not want to share his knowledge or his woodlots, saying that his tactics were secrets not to be disclosed for fear that I would learn how to kill his turkeys.

Finally, when I was 34, I found someone to take me on my maiden turkey hunt. The friend called in three gobblers, which came to a stop in a neat row just 20 yards from where I was sitting. I then proceeded to shoot at—and miss—each member of the trio, so overcome I was with nervousness and excitement. I was so embarrassed that day, I silently vowed to become an accomplished turkey hunter.

Twenty-two years later, I regularly write about turkey hunting for numerous magazines and even give seminars on these big game birds. But I have never forgotten the frustration that I experienced when I tried to take up hunting. Nor have I ever understood why so many sporting magazines fail to include information on how to begin hunting or fishing—despite the fact that the number of hunters continues to decline and angler numbers are merely holding their own in much of the country.

Here are some resources for Tar Heel State individuals who want to experience the sport of turkey hunting, as well as a primer of tips.

Consider the NWTF The National Wild Turkey Federation (NWTF) has labored mightily since its

RALPH HENSLEY

inception to restore and improve turkey populations in North Carolina and other states. Bryan Burhans, director of land management for the NWTF, lists three ways the organization helps novice turkey hunters.

"One of the biggest ways we have brought turkey hunting to the masses is through our seven publications, of which *Turkey Call* magazine is the [flagship] publication, and our three television shows," he says. "*Turkey Call* offers a wealth of tips for folks from beginners to experts in every issue. And our shows cover everything from hunting to habitat tips.

"A second way is through our local chapters and their banquets. Novice hunters can visit one of our banquets, introduce themselves, and find a person who can hopefully take them hunting and become a mentor."

In the mid-1980s, when I was a turkey hunting rookie, I attended my first NWTF banquet. I struck up a conversation with an expert hunter, and he kindly agreed to take me afield. He became one of my early mentors, and we became close friends and shared many adventures in the spring woods.

"A third way is through our Women in the Outdoors program," continues Burhans. "For example, my sister-in-law was pretty close to being an antihunter; she wouldn't even let her kids watch hunting shows on TV. However, several years ago she attended a Women in the Outdoors event, and this experience sparked a real interest in shooting. And before long, she tried her hand at turkey hunting and became hooked. And I mean hooked bad!

"Just this past spring, she called in her husband's first turkey. On top of that, she has taught their three children how to hunt. Now, all of the children have harvested turkeys and that family has a hunting heritage to pass on to future generations. If we can introduce mom to the joys of hunting and the conservation ethics of hunting, we can effectively reach the entire family."

Wilkes County resident Dowd Bruton is a former biologist for the NWTF. He agrees with Burhans that involvement in local chapters is very helpful toward making hunting contacts. Bruton says that many individuals are very protective of their hunting grounds and often won't share them. A good way for novice turkey hunters to overcome that tendency is to strive to gain permission to private land and then ask knowledgeable hunters to accompany them there. In this situation, Bruton says that usually he will call for the beginner and that he himself will not bring a gun.

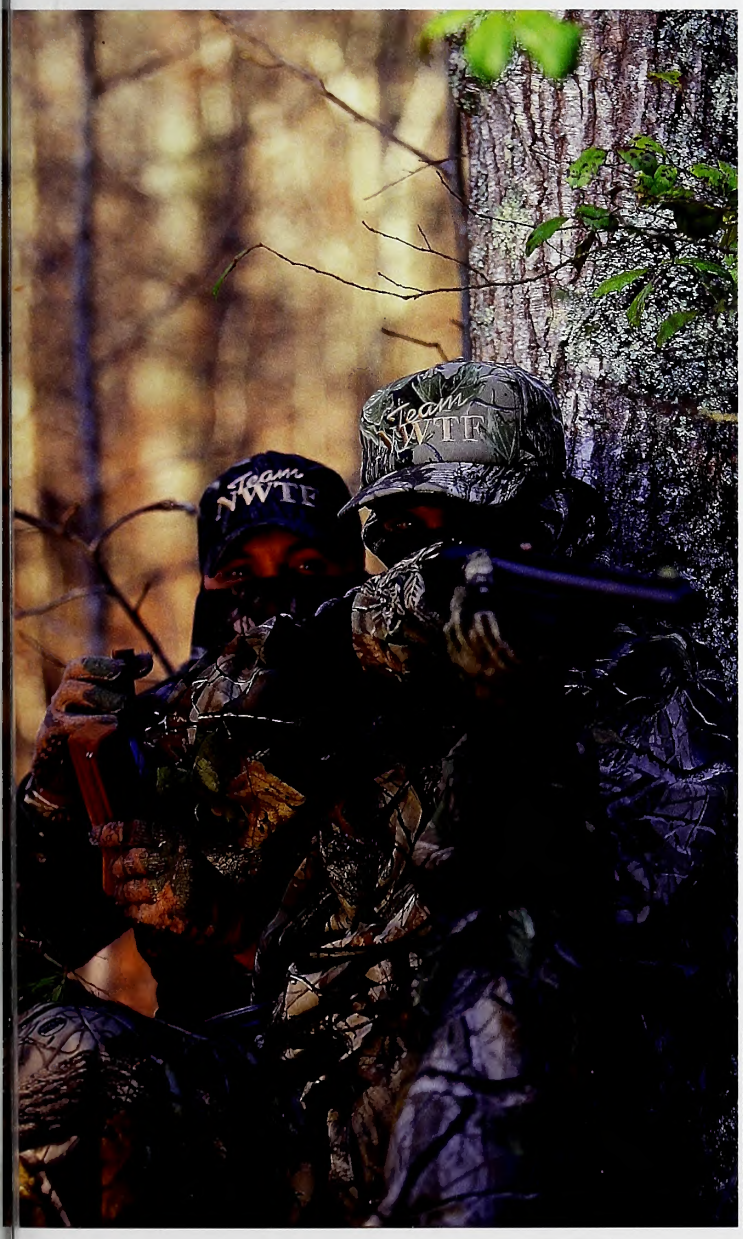
"Usually the response is that I should bring my gun, but I always try to insure that the novice hunter gets the first shot," adds Bruton. "Public

RALPH BENSLEY

For novices, wild turkey hunting is much easier with a mentor to teach fundamentals such as camouflage, calling (box calls above and right) and how turkeys use habitat. Without someone to teach a new turkey hunter these skills, the pursuit of these wily birds could become a frustrating repetition of trial and error.

RUSSELL GRAVES

RUSSELL GRAVES



NATIONAL WILD TURKEY FEDERATION

hunting is also an option for the beginner. I have killed dozens of turkeys on public land. Most of these areas, if you're willing to walk a little, can offer quality hunting opportunities." In my third year of trying, I killed my first spring gobbler and it came from public land. And, yes, I committed plenty of snafus before tagging that first tom.

"Obviously, there are many avenues that beginning turkey hunters can utilize from the NWTF," concludes Bruton. "Our TV shows provide a ton of guidance on actually hunting turkeys, including safety, set-up and calling. We also have a program that focuses on habitat and provides ideas and techniques for proper land management. We usually have one or two field days annually, and they are geared towards habitat improvement. These are good places to find a friend that might let you hunt."

For more information on North Carolina chapters, visit www.nwtf.org, go to About the NWTF, Find a Local Chapter, and click on North Carolina.

State Programs Brad Gunn, section manger for the wildlife management division of the N.C. Wildlife Resources Commission, says that beginning adult hunters can do three things that will help them enter the pastime. The most important action, he says, is for individuals to complete a hunter education class. Participants can find class schedules on the agency's Web site, www.ncwildlife.org. If an individual is disabled or a youth, he merely has to arrange to go afield with a properly licensed adult.

"A second thing is our Hunting Heritage License, which we hope to have ready for adults in 2009," says Gunn. "This is a 'try before you buy' type license for $5, which would give individuals who have never hunted before all the privileges of the state's annual comprehensive hunting license. The goal is to encourage a nonhunter to try the sport, hopefully like it, and then become a regular license buyer."

Last, continues Gunn, has been the creation of a user-friendly Web site, where both novice and veteran hunters can help themselves to find public lands near their homes. Merely log onto the site and go to Hunting/Trapping, Maps and Interactive Game Lands. Individuals can further define their search by determining how far they want to travel to visit public land.

Getting Started: Learning How to Call Gunn relates that novice turkey hunters often are concerned that they won't be able to imitate the sounds of real birds well enough to call them in. Gunn, who himself did not begin turkey hunting until his early 20s, maintains that this is an unfounded worry.

"Not long after I began turkey hunting, I set up near a logging road and heard these gosh-awful hen sounds slowly becoming louder," he recalls. "I thought it was some hunter, who called even worse than I did, walking toward me. Instead, it was a real hen turkey that didn't even sound like I thought a hen should.

"My point is that if novice hunters can make basic turkey sounds — cluck, yelp and purr — they should do just fine. People can pick up more advanced calling tips by listening to audiotapes, watching TV shows and attending seminars, but they don't have to be perfect."

Randolph County's Greg Longuillo, who operates L&L Turkey Calls in Trinity, offers these tips. "The push-pin turkey call is the easiest for beginners to use," he says. "The box call would be the next easiest."

Longuillo relates that by merely pulling the pin back and forth on a push-pin, an individual can easily create hen yelps. Similarly, hunters can mimic both yelps and clucks by sliding the lid across the top of a box call.

Friction calls, such as the pot and peg, are another good option continues the Trinity resident. These soundmaking devices feature a surface (such as one made from slate or glass), a pot on which that surface is mounted, and a peg which is drawn across the top of the call. In just one session, a novice can become reasonably adept with any of the above calls.

Mouth calls, also known as diaphragms, are much more difficult for many individuals to learn how to use. For instance, I experienced six months of frustration before making my first semi-realistic yelps with a diaphragm. However, those initial sounds were good enough to lure in a mature gobbler, which I killed.

"Yelps are the standard sound that hunters imitate, but clucks and purrs are also very effective and easy to learn how to make," Longuillo says. "Push-pins are super for imitating clucks, and a novice can easily learn how to create a purr with a slate. Regardless of which call you use when you start out, I recommend that you stick with that call until you master it. The more confidence you have with a call, the more you will use it, and the more successful you will be."

Camouflage Longuillo did not begin his turkey hunting career until he was in his 20s, and experienced a five-year dry spell before killing his first tom. That bird was tagged, he recalls, while he was afield in old-fashioned military-style camo.

"My point is that the brand of camo that someone wears is not as important as the ability to learn how to sit still for long periods of time," he explains. "All the modern hunting-clothes

RALPH HENSLEY

RUSSELL GRAVES

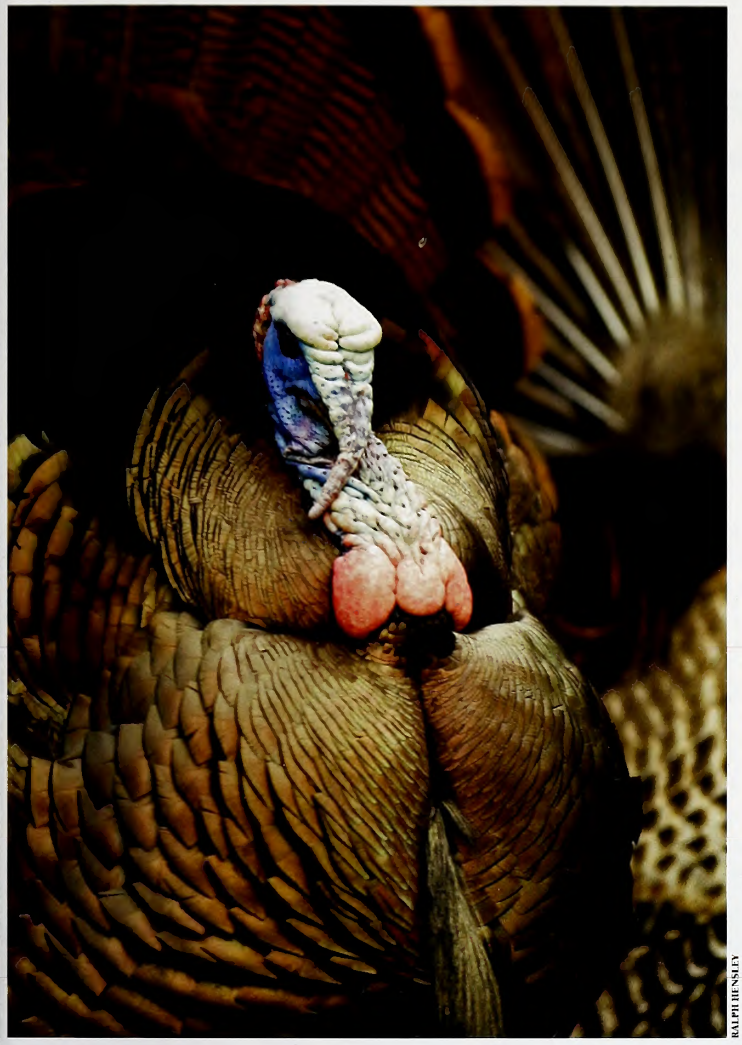
companies make excellent camouflage. The person who practices patience and stays alert while scanning the woods is the individual who is going to be most successful, regardless of his brand of camo.

"One tip that I do believe in is that hunters should wear camo that has more and more green in it and less and less brown as spring progresses."

Shotgun and Shells Linda Powell, senior manager of press relations for Remington Arms in Madison, relates that a number of possibilities exist regarding what kind of shotgun a new hunter should select.

"If the individual is small in stature, he or she might want to go with a 20 gauge," she explains. "With the new, hard-hitting loads that exist, relatively little range is lost with a 20 gauge as compared to a 12. If a new hunter is likely to use a shotgun for other types of hunting, for example waterfowling which often takes place in poor weather, then that individual might want to choose a pump, which is known for its reliability.

"On the other hand, many new and veteran hunters prefer an autoloader, which typically



RALPH HENSLEY

has very little recoil, which is a concern for many folks. Regarding loads, I recommend buying boxes of No. 4s, 5s and 6s, and then shooting them at distances of 25, 30 to 35 and 40 yards and see which load patterns best in a particular shotgun."

Powell says that many hunters find that fiber optics instead of the traditional sights improve their shooting accuracy. Some even opt for scopes (see "Scattergun Specificity," page 14).

Will you take to the Carolina woods for the first time this spring? Consider these words from Bryan Burhans.

"Turkey hunting is such an interactive experience with nature," he says. "The joy of hearing all those neotropical songbirds singing, seeing the sun shining on a bright spring day, smelling the soil with that spring earthiness about it, being among those wildflowers blooming, and then you hear that turkey gobble. The actual killing of a bird is a very small part of why we turkey hunters enter the woods." ◆

Bruce Ingram is the author of four books on river fishing and floating. For more information, contact him at be_ingram@juno.com.

North Carolina Hunting Facts

According to a 2003 Responsive Management Survey (www.responsivemanagment.com):

- The state ranks 38th for total number of acres of state controlled land, i.e. State Game Lands
- Ranks 37th for percentage of state available to be hunted, i.e. rural enough to allow hunting
- Ranks 29th for ratio of acres of hunting land available per hunter.
- Some 400,000 licensed hunters live in the state.

Mark Damian Duda, executive director of Responsive Management, lists three reasons why hunter numbers decline.

"The primary culprits are the big three: urbanization, an aging of the population and access," he says. "The future of hunting depends on current hunters mentoring non-hunters. Hunting is an activity that is passed from person to person, from mentor to student. Programs that encourage hunters to mentor nonhunters are not only important to ensure the future of hunting in North Carolina, which ensures the future of wildlife conservation, but also to transmit valuable knowledge on techniques and ethics that can be learned in no other way.

"In our studies of hunting mentorship, mentors say that the rewards from teaching others how to hunt are as rewarding as hunting itself. Students tell us that they make friendships that last a lifetime. There is something truly special about passing on the hunting tradition from one person to another. And both mentors and students remember the experience for the rest of their lives."

For More Information

L&L Turkey calls:
www.llcustomturkeycalls.com.

N.C. Wildlife Resources Commission:
www.ncwildlife.org

National Wild Turkey Federation:
www.nwtf.org

Remington Arms:
www.remington.com

HIERARCHY OF HURT

written by Mark Joyner · illustrated by Jackie Pittman

Getting stung is always painful, but to what extent? The Schmidt Sting Pain Index ranks the discomfort level of many insect stings in excruciating detail so you don't have to.

When was the last time you were stung by a honeybee? How about a bumblebee, wasp, yellow jacket or hornet? All stings hurt, just as they're supposed to, but some are certainly worse than others. If you've ever wondered how they rank against each other, something called the Schmidt Sting Pain Index can help you find out.

Created by entomologist Justin Schmidt, the pain index attempts to rank stings on a scale from mildest to most severe. Fire ants are near the bottom, for instance, barely above the tiny sweat bee. Yellow jackets and bald-faced hornets are somewhere near the middle, both receiving a 2 on a scale of 4. Honeybees are higher still, and wasps rank at the peak of the pain scale.

My own experiences lead me to different conclusions, but I will say that the descriptions are absolutely inspired. The sting of a yellow jacket is said to be hot, smoky and irreverent, like having a cigar extinguished on your tongue. By comparison, a bald-faced hornet's sting is hearty and slightly crunchy, not unlike getting your hand mashed in a revolving door. As for the dreaded wasps, their stings are caustic and burning with a distinctly bitter aftertaste, reminiscent of pouring acid onto a cut. It occurs to me that Schmidt has performed a valuable service here, although in the process he may have been stung a few times too many.

Personal Touch

Not to quibble with the pain index, but how could anyone think the sting of a honeybee is worse than that of a hornet? After all, beekeepers (as opposed to hornet keepers) are routinely stung in the course of their work, and you don't hear them complaining all that much.

By way of full disclosure, I should confess that I'm somewhat partial to honeybees. Apparently, as a toddler I climbed onto one of my grandfather's bee gums (that's what old-timers called beehives, which were often made from hollow sections of gum trees). Needless to say, I was stung many times by the honeybees, which leave their stingers in their victims and subsequently go away and die. However, after swelling up and throwing up, I recovered with no lasting effects other than an insatiable desire for honey.

There's more to bees than honey, of course. It's estimated that as much as a third of our food supply is dependent on pollination by bees in their incessant search for nectar and pollen. By some accounts, bee populations are in decline these days, with the troubles blamed on everything

from pesticides to cell phones. And it's not just honeybees (see "Plight of the Honeybee, Flight of the Bumblebee," September 2008). Bumblebees are feeling the pinch, too, so much that indoor greenhouse operations are now raising their own colonies to aid with the pollination of tomatoes, melons and other crops.

AS FAR AS RANKING GOES, I'D VENTURE THAT MOST PEOPLE CONSIDER HORNETS TO BE AT THE TOP OF THE PAIN SCALE, IF FOR NO OTHER REASONS THAN THEIR SIZE, TEMPERAMENT AND ABILITY TO STING OVER AND OVER AGAIN.

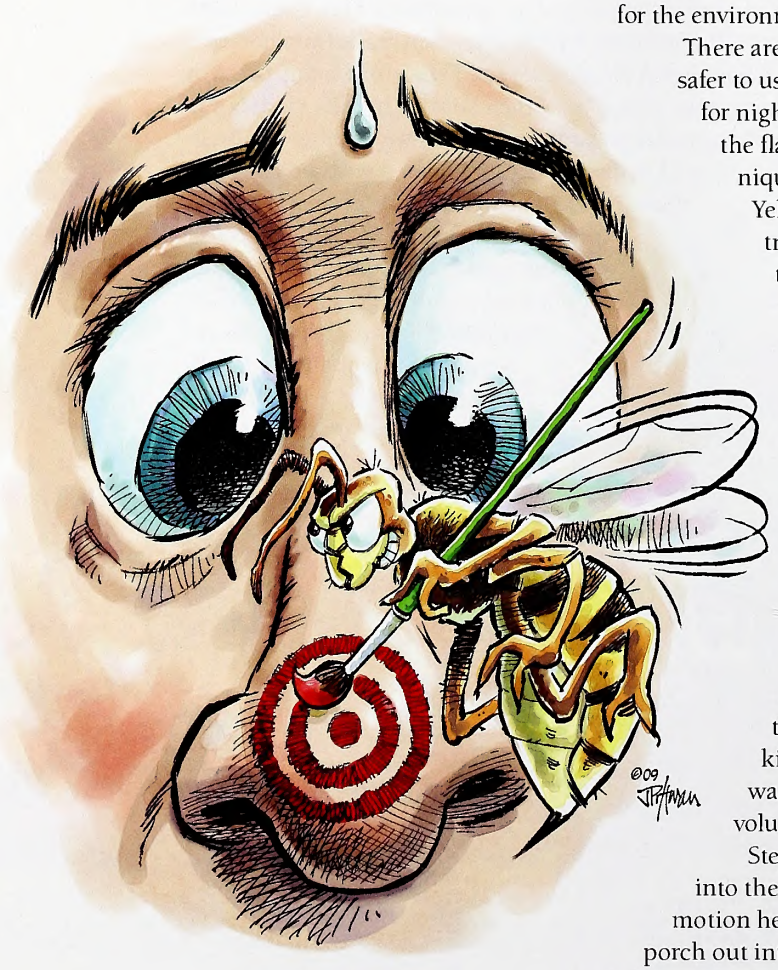
Flaring Tempers

But is the sting of a honeybee really worse than that of a yellow jacket or a hornet? Although I haven't been bothered by honeybees in years (professional courtesy and all that), I somehow manage to stumble into a yellow jacket nest almost every summer. That was me hurtling the grapevines in the backyard, running off and abandoning the lawn mower to an angry horde of the demons.

Sure, they're small, but what they lack in size they more than make up for in fury and numbers. Yellow jackets are actually social wasps that live underground in colonies that can be enormous. A nest can easily number in the thousands, but the record may be one found in Georgia in 1991 with an estimated 250,000 inhabitants!

Believe it or not, yellow jackets perform a largely beneficial role, preying on harmful insect pests such as caterpillars, which they dutifully bring home to share with their young. By late summer, when the kids are grown and gone, their tastes change to sweeter fare such as picnic baskets and open soft-drink cans, and human encounters are inevitable. Swallowing a live yellow jacket and getting stung on the tongue is an unforgettable experience, leading to the urge to eradicate all nearby nests. In days past it was common practice to seek revenge by pouring gasoline down a nest. Impatient types insisted on lighting it as well, then standing back and chanting as the flames rose. Admittedly it's effective, but it's also terrible for the environment.

There are a number of effective sprays and dusts on the market that are safer to use and can knock out a nest just as well. Most are recommended for nighttime application, and here's a hint: Don't be the guy holding the flashlight. For those who favor a nonchemical fix, a novel technique involves a clear glass bowl inverted over the nest opening. Yellow jackets don't have a back door and apparently will keep trying to come forth until they've all expired. I haven't actually tried this, but it sounds like it might work. It also sounds like the kind of thing I'd get curious about, bending down close for a better look and in the process tipping the bowl over.



Mortal Combat

Wasps in general are not as aggressive as yellow jackets, unless of course they perceive a threat to their nest. By midsummer, a wasp nest can grow up to 12 inches or more in size and contain hundreds of individuals. I once found an especially large nest like that under the eave of my house, and a buddy and I decided it had to be removed. As I recall, we held differing opinions as to the best method of destroying it without personal injury. I favored a long stick, but he belonged to the paint-thinner school of thought, maintaining that it would instantly kill or disable every member of the congregation. The trick was to get close enough to drench them thoroughly, which he volunteered to demonstrate.

Stepping up onto a carefully positioned ladder, my friend eased into the killing zone under the wasps' watchful eyes. With a swirling motion he dashed a jar full of the liquid onto the nest and sailed off the porch out into the yard. It was exceedingly well done, and in truth I don't believe a single wasp even made it airborne.

Naturally, we couldn't resist going back to inspect the scene of the crime. Keeping an eye out for survivors, we crept close and peeked over the hedge of boxwoods. The sight of my friend's exposed neck was understandably too good to pass up, and I dropped a holly leaf down the back of his shirt. The effect was explosive. Letting loose a terrifying scream, he instantly took off running while desperately trying to tear the shirt off his back. It took me a while to catch up with him in the back yard and confess to the deed, which he graciously allowed was pretty funny after all.

Steering Clear

By comparison, I think most people realize a hornet nest should be treated with far more respect. Hornets, or at least the common bald-faced variety, are themselves members of the wasp family. In fact, they're really overgrown yellow jackets that have abandoned the underground life in favor of an airborne lifestyle. Unlike a honeybee, which can sting only once, an angry hornet can sting repeatedly, as well as deliver a fierce bite. Its venom is a potent cocktail containing a compound known as acetylcholine that stimulates more pain receptors than a bee's sting.

I had a close call some years ago while walking through a thicket of young pine trees. I barely avoided being swished in the face by a hornet nest about the size of a football. As an intruder I was obliged to freeze, eye to eye with what resembled an aircraft carrier with its nearly constant takeoffs and landings. I'm pleased to report I was not stung that day, perhaps because I was not standing directly in the flight path. That's one of the things that can lead to an attack, along with crushing or killing a hornet anywhere near its nest. Doing so releases an airborne chemical that sends out an instant alarm message to the rest of the gang. Actually I wasn't even noticed, and I slowly backed away, which says a lot about leaving things alone if they're not bothering you.

The black-and-white bald-faced hornet looks like a piker compared to an introduced species known as the European hornet, which can grow to nearly 2 inches in length. It was accidentally brought here in the mid-1800s and is technically the only true hornet in this country. You may have seen these creatures sipping sap at the base of trees, but because they're active at night, they're also attracted to porch lights. By most accounts the big fellow is a peaceable sort that just wants to be left alone. I've seen pictures of intrepid naturalists letting these "gentle giants" crawl around on their noses, although I sometimes wonder if those are the "before" and not the "after" photos.

Grades of Pain

As far as ranking goes, I'd venture that most people consider hornets to be at the top of the pain scale, if for no other reasons than their size, temperament and ability to sting over and over again. That's not to take away anything from wasps, which can be brutal. Just this past summer I brushed my hand against a nest of the big red variety while reaching under the deck for a water faucet. Luckily I was stung only once, but bonus points are awarded for it being on the very tip of a finger.

I'm placing bumblebees next in line. In addition to inflicting a hefty sting, they can be tenacious in continuing a chase beyond reasonable expectations. Next would come yellow jackets, also noted for their disposition, and lastly honeybees. But such an abbreviated list doesn't even take into account less common species such as the velvet ant. This furry-looking red "ant" is actually a solitary wasp, and its common name — cow killer — gives some hint of its stinging ability. Clyde Sorenson, an entomologist at N.C. State University, assures me the worst sting of his life came from carelessly picking up one on a field trip at Morrow Mountain State Park.

Whatever your personal pain index may be, it's important to realize that all of these creatures are merely employing self-defense mechanisms that have evolved over millions of years. Or, as a colleague of mine used to say, they're simply trying to make a living, just like us. ◆

Mark Joyner is executive vice president of the N.C. Aquarium Society and a regular contributor to Wildlife in North Carolina.

THE SCHMIDT STING PAIN INDEX

- 1.0 Sweat bee: Light, ephemeral, almost fruity. A tiny spark has singed a single hair on your arm.
- 1.2 Fire ant: Sharp, sudden, mildly alarming. Like walking across a shag carpet and reaching for a light switch.
- 1.8 Bullhorn acacia ant: A rare, piercing, elevated sort of pain. Someone has fired a staple into your cheek.
- 2.0 Bald-faced hornet: Rich, hearty, slightly crunchy. Similar to getting your hand mashed in a revolving door.
- 2.0 Yellow jacket: Hot and smoky, almost irreverent. Imagine W.C. Fields extinguishing a cigar on your tongue.
- 2.0+ Honeybee and European hornet. Like a match head that flips off and burns on your skin.
- 3.0 Red harvester ant: Bold and unrelenting. Somebody is using a drill to excavate your ingrown toenail.
- 3.0 Paper wasp: Caustic and burning. Distinctly bitter aftertaste. Like spilling a beaker of hydrochloric acid on a paper cut.
- 4.0 Pepsis wasp: Blinding, fierce, shockingly electric. A running hair dryer has been dropped into your bubble bath.
- 4.0+ Bullet ant: Pure, intense, brilliant pain. Like walking over flaming charcoal with a 3-inch nail in your heel.

NATURE'S WAYS

How Does A Honey Bee Sting?

See Nature's Ways, page 39.

RUSSELL GRAVES

SCATTERGUN SPECIFICITY

written by Michael O. Humphries

Turkey hunters can be a particular lot, and for them sometimes a standard shotgun just will not do. That's why the modern specialized turkey shotgun is so very different from its everyday brethren.

How long have specialized turkey shotguns been around? "As long as there has been turkey hunting," says Joe Coogan, brand marketing manager for shotgun maker Benelli USA.

At first blush, a specialized shotgun may seem a bit counterintuitive. In most cases, the shotgun is a model of versatility—exceedingly adaptable and flexible, and useful in a variety of roles. For many sportsmen, the simple, smoothbore shotgun is applicable to just about any type of hunting that can be imagined. Due to the nature of its design, a smoothbore shotgun can chamber and fire a variety of shell lengths and loadings, with appropriate targets ranging from clays thrown in skeet and trap to big game such as bears and deer.

Does that mean that infinite, nonspecific generality is the highest form of evolution for the modern shotgun? In a word, no. As with any tool designed for a discipline with a motivated following, the shotgun has the potential to become a highly specialized firearm. As so succinctly put by Coogan, there always has been and likely always will be a desire by sportsmen to have specialized tools for specialized disciplines (as well as an excuse to buy a new shotgun). This fact is not lost on shotgun manufacturers, whose business is to keep up with customers' demands.

And, though there have been turkey guns for a long time, recent trends have taken the turkey shotgun, most often a slide-action or semi-automatic, into new and uncharted territory in regard to its configurations and capabilities.

ON TARGET

Turkey hunting takes one of the most basic premises of shotgunning and turns it on its end. In practically every other situation in which a shotgun is used (apart from firing slugs at big game), the smoothbore firearm firing a cloud of pellets is pointed rather than aimed. As a result, the standard shotgun sighting system is often a simple bead at the muzzle end of the barrel. During the split second a hunter has to aim at his fast-moving target, this bead is moved over the target and the shot fired.

This is not true in turkey hunting, which necessitates more precise aiming. Unlike conventional bird hunting, in which the goal is to put as many pellets into a bird's body as possible in order to bring it down, turkey hunters aim at the middle of their quarry's neck and avoid body shots. This requires a tight pattern of pellets aimed very precisely, much like a rifle.

One of the more recent developments to address this has been the adoption of rifle-style sights on turkey shotguns, consisting generally of a standing-post front sight and a notch rear-sight assembly. Even more recently, many turkey guns have come from the factory equipped with some form of fiber-optic sights that use small, colored light-gathering strips of fiber-optic material to make them even more visible. These are available in a variety of colors, with yellow and green inserts being the most popular for low-light conditions at sunrise or sunset, and red being more popular for shooting in bright sunlight.

IN FOCUS

However precise rifle-style sights may be, turkey hunters began to want even more precision from their shotguns. As a result, turkey shotguns soon began to feature something even more radical: receivers drilled and tapped to accept scope-mounting rails.

With the ability to mount an optic, turkey hunters could apply even more precise volleys of shot at their intended targets. Although turkey hunters initially used conventional rifle scopes on their guns, scope manufacturers took note and began to develop turkey-specific optics for shotguns. More often than not, these are relatively low-power scopes (with magnification usually in the 1.5X to 4X range) that feature turkey-specific reticles. For example, the Leupold VX-I 1-4x20 mm turkey scope features a "Turkey-Plex" reticle that is designed to subtend a turkey's head at 40 yards when the scope is at full 4X magnification.

RUSSELL GRAVES

Nikon Red Dot Scope

Aimpoint 9000SC Red Dot Scope

Leupold VX-I 1-4x20 mm Scope

Modern electronic sights, such as these Nikon and Aimpoint models (top and middle), offer fast and instinctive aiming. For more precision, the variable-power Leupold scope (above) features 4X magnification and a Turkey-Plex reticle that subtends a turkey's head at 40 yards.

However, even these scopes are reasonably conventional when compared to one of the fastest-growing optics applications in turkey hunting: electronic sights. These optics, often known as red-dot scopes, feature an illuminated aiming point (often a dot, but sometimes a small crosshair or similarly shaped reticle) projected inside the tube of the optic. Unlike rifle-style sights that require the shooter to line up three points (the rear sight, the front sight and the target), this optic requires that the shooter line up only two—the aiming point and the target. The result is a lightning-fast, instinctive and precise aiming device.

Adding to the speed of this form of sight is the fact that the dot does not need to be centered in the tube of the optic. No matter where the projected dot is located inside the tube, as long as it is visible and placed on top of the target, the shotgun is properly aimed.

LONG AND SHORT OF IT

Another change in the turkey-specific shotgun is directly related to the fact that you aim rather than point a turkey gun. With a standard shotgun, swing and balance are paramount concerns. As a result, traditional shotgun barrels tend to be on the longer side, generally at 26 to 30 inches.

Turkey guns require different considerations. Because they are aimed like a rifle,

Stoeger's Nod to Tradition

Though the majority of turkey guns are either slide actions or semi-automatics, there are a few other guns on the market that can also fit the bill. One is the Stoeger Condor Outback, part of the company's Brazilian-made Condor line of reasonably priced over-under shotguns.

For those who prefer stack-barrel guns, the Outback can be an interesting option with its 20-inch barrels and open rifle-style sights. Available in both 12 and 20 gauges in two versions, one with a traditional blued finish and walnut stock set and the other with a weather-resistant nickel-plated finish and a black-finished hardwood stock, the Outback offers turkey hunters the chance to have a specialized over-under shotgun for their specialized sport.

NATIONAL WILD TURKEY FEDERATION

BENELLI USA

For more information, please contact the following:

Aimpoint, 1-877-246-7646, www.aimpoint.com

Benelli USA, 1-800-264-4962, www.benelliusa.com

Leupold, 1-800-538-7653, www.leupold.com

Mossberg, (203) 230-5300, www.mossberg.com

Nikon, nikonhunting.com

Stoeger, 1-800-264-4962, www.stoegerindustries.com

Remington, 1-800-243-9700, www.remington.com

The features of the modern turkey gun, from protruding pistol grips to optics to extended choke tubes, make for highly specialized and highly capable firearms.

swing and balance are of lesser concern, so a shorter barrel can be employed. In fact, with this type of hunting a shorter barrel is preferable. When you are pursuing a target as wary as a turkey, brevity of movement in your area of concealment is a must. Unlike with flushing birds, when action must be taken in a flash, calling in a turkey may require extremely subtle movements to reposition for a shot. As a result, compactness of size is a bonus, with most turkey-specific guns sporting barrels generally ranging from 24 inches on the longer end to as short as 20 inches in many cases.

"Turkeys are one of the spookiest game animals. They just don't tolerate movement," says Eddie Stevenson, press relations manager with gun maker Remington. "Specialty items such as short barrels allow you to get your sights on a bird with the least amount of movement and effort."

Many manufacturers have noted a distinct swing toward even smaller and more compact shotguns. "The trend we have seen with modern turkey guns is for smaller packaging, resulting in a more compact design," says Mark Kresser, vice president of sales and marketing for gun maker Mossberg. "In fact, we have seen an interesting move in the market, with 20-gauge turkey guns becoming more popular as well." However, the old 10 gauge should not be totally discounted. "Our SP10 10-gauge shotgun has a small, die-hard following of turkey hunters," notes Remington's Stevenson.

However, the 12-gauge shell is still king in turkey hunting. In an interesting juxtaposition, while the length of barrels has become shorter, the length of chambers in 12-gauge barrels has grown longer. Although more traditional 12-gauge chamberings such as 2 ¾ inches and 3 inches are used effectively in turkey hunting, the greater shot payload capacity of the newer 3½-inch shell has become quite appealing to many turkey hunters.

An offshoot of the move from lead to steel shot in the late 1980s, the 3½-inch 12-gauge shell was developed to allow waterfowl hunters to fire a larger number of the new steel pellets, which did not perform as well as a comparable amount of lead shot. Realizing that more shot can often be better, hunters from other shotgunning disciplines began to take a look at the longer shell length and its capabilities. Turkey hunters recognized that the longer shell could potentially put a thicker cloud of shot on their intended targets. "The brain and spinal cord of a turkey are very small targets, and some hunters prefer the added pellet count of these loads," states Stevenson. "Every pellet counts when you have such a small target."

Complementing this increased shot capacity and power is the common use of specialty choke tubes in turkey guns, such as extra-full chokes. This in a 12-gauge shotgun, with its 0.040-inch constriction at the muzzle, helps ensure that the pellet pattern is tight enough for a kill shot on a turkey's head and neck out to distances of 40 yards.

NO BUTTS ABOUT IT

Although the mechanical elements of the turkey gun, such as the chambers, chokes and sights, are significant, the hunter is the most crucial factor in the hunt. Therefore, the way the gun fits the hunter is one of the most important considerations. Modern turkey shotguns have been outfitted with some radically unique stock assemblies that are designed to enhance the guns' capabilities for their specialized tasks.

Several manufacturers turned to another segment of the firearms industry to develop new turkey gun stocks—the tactical shotgun realm. Although it may seem odd that a turkey hunting gun and a self-defense-style shotgun could share some characteristics, a closer look reveals the logic behind the move.

"When we began to notice the trend toward smaller, more compact turkey guns,

we took a look at some products we had developed in our tactical line for inspiration," says Mossberg's Kresser. What they focused upon were collapsible stocks (in the style of AR-type rifles) on some of their slide-action shotgun models that allowed the length of the stock to be adjusted with a push of a button.

However, Mossberg was not the only manufacturer heading in this direction. Benelli, a company as well known for its tactical guns as for its sporting designs, took a look at its own Steady Grip stock design for adaptation to its turkey gun line. "It was a perfect fit, in our opinion," says Benelli's Coogan. "A Steady Grip pistol-grip style of stock allows you to come to battery or switch shoulders with minimal movement—important considerations when calling in a turkey."

Like the Mossberg stocks, the Benelli Steady Grip features a built-in vertical pistol grip rather than a conventional curved grip. Most turkey hunting requires a hunter to sit still and at the ready for prolonged periods of time. It was discovered that holding a pistol grip in that position was more comfortable than a standard curved grip.

Benelli soon adapted the stock to fit not only the Benelli semi-automatic and slide-action shotguns, but also Stoeger's (a subsidiary company of Benelli) line as well. Mossberg also followed the trend and added offerings to its slide-action and semi-automatic turkey gun lines that featured non-collapsing fixed stocks with built-in vertical pistol grips. However, Mossberg and Benelli were not the only ones to make this move.

Remington also began to offer turkey guns configured this way. After a bit of experimentation, the company settled on the new ShurShot stock, which is a little more traditional in appearance than the other tactical-style stocks, with a "thumbhole" configuration that connects the vertical pistol grip to the body of the fixed stock. "We discovered that having a vertically configured pistol grip on the stock, such as with the ShurShot, offered a lot of benefits," says Stevenson. "Unlike with a conventional curved pistol-grip stock, this type allows you to hold the gun with one hand in position while you use the other for calling."

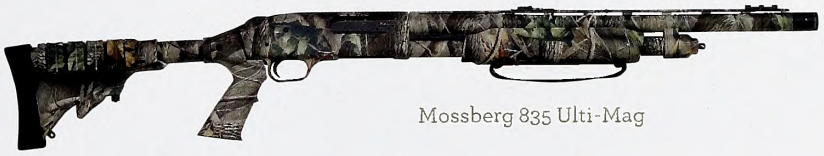
In a similar vein, and in recognition of the power of the shotshells used in turkey hunting, practically every turkey gun's stock comes with some sort of recoil dampener. Remington's ShurShot stock comes standard with a SuperCell recoil-reducing buttpad to ease the pain of the perceived recoil. All of Benelli's and Mossberg's guns also come with some form of recoil dampener.

Benelli SuperNova

Benelli Super Black Eagle II

Remington Model 870

Remington Model 11-87



Mossberg 835 Ulti-Mag

Mossberg 935 Magnum

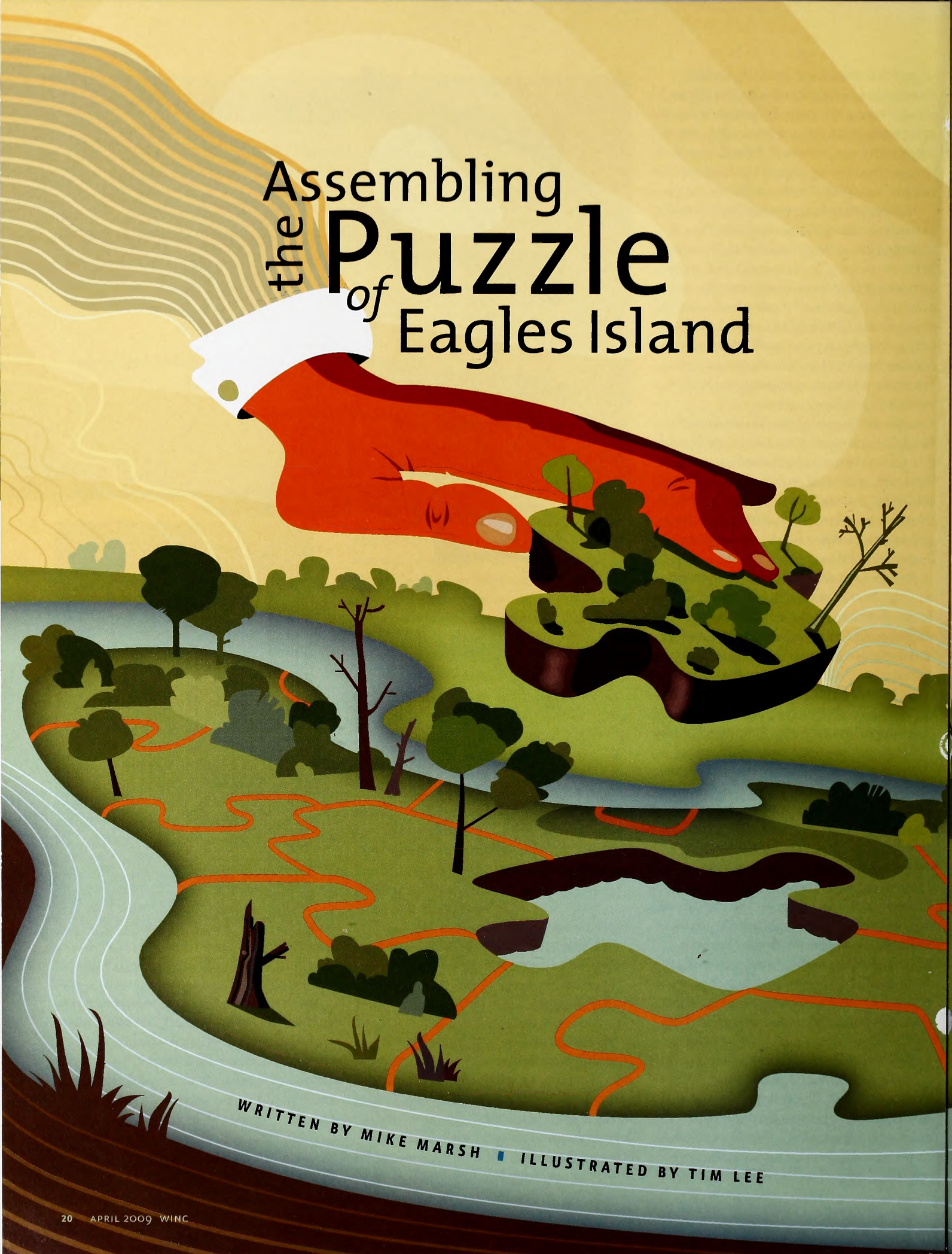
THAT'S WHY

"I have been turkey hunting for years with different types of shotguns," says Bob Patterson, an avid turkey hunter from Greensboro. "Over the past few years, I have slowly tricked out my shotgun with a red-dot scope, pistol-gripped stock and a few other odds and ends. Although I took some abuse from my friends at first over it, it was worth the trouble. The gun is just easier to use out in the field, and I would not go back now. I just wish I had bought one like this in the first place."

Hunters have taken turkeys for decades with simple, ordinary shotguns. However, with so many refined, task-specific turkey guns and accessories available, there is little reason not to take advantage of them now. And it might be a good excuse to buy a new shotgun. ◆

Michael O. Humphries is managing editor of Wildlife in North Carolina.

Assembling the Puzzle of Eagles Island



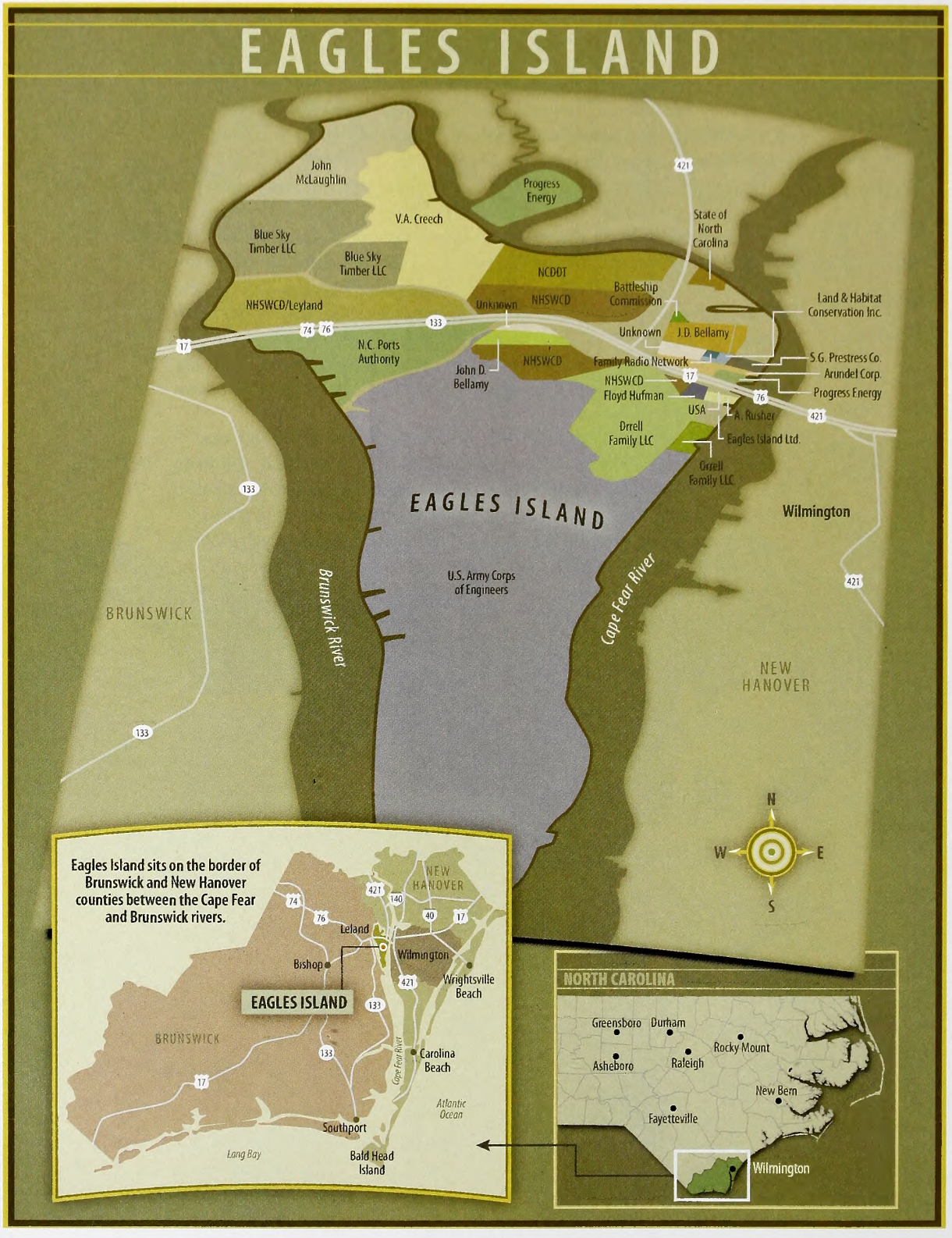
WRITTEN BY MIKE MARSH ▪ ILLUSTRATED BY TIM LEE

A grassroots coalition came together to take on the difficult challenge of protecting an island adjacent to Wilmington from development. Their efforts could become a model for others to follow.

Thousands of people pass through Eagles Island daily. But during their hectic commute, whether to the east or west along U.S. 74-76, or north or south along U.S. 421 on this patch of marshland between Brunswick and New Hanover counties, most drivers have neither the inclination nor the ability to pay much attention to the expanse of serenity stretching far to the north and south from the busy thoroughfare.

U.S. 74-76 roughly bisects Eagles Island into northern and southern halves, and the island is further divided by U.S. 421, which forms a junction with U.S. 74-76 at the eastern side of the island. The highways cut the 2,100-acre island into smaller chunks, while still other divisions are formed by the various creeks and navigation channels cutting through the island's truly unique marshes. But it's the patchwork of property lines that creates the biggest obstacle to those who seek to preserve the island and protect its natural and historic treasures for future generations to enjoy, whether they are viewing it through a windshield, over a spread of duck decoys or from a boat.

Undaunted by the jigsaw-puzzle look of Eagles Island's property lines, a loosely associated group of agencies, entities and individuals has been quietly doing just that. To those who know the island well, it's a natural paradise, not simply a wet, mosquito-infested wasteland to be taken for granted or ditched, dug and destroyed. All but unnoticed, the Eagles Island Coalition has been patiently piecing back together the jumbled-up picture of Eagles Island, one piece at a time.



The north end of Eagles Island is a patchwork of tracts owned by more than two dozen private citizens, corporations and governmental agencies. The south end is owned mostly by the federal government.

MIKE MARSH

MELISSA McGAW / NCWRC

MIKE MARSH

At left, Cape Fear Riverkeeper Doug Springer gives a boat tour of the island. Center, some of the major players in the conservation of Eagles Island: Marilyn Meares of the USDA Natural Resource Conservation Service, author Mike Marsh, biologist and grant writer Dawn York and Springer. At right is one of the island's many canals once used for agriculture or other commerce decades ago.

Putting together the big picture

Marilyn Meares has been the leader of the Eagles Island preservation effort for eight years. Her involvement in the preservation project was serendipitous, with the first piece of the puzzle falling into place by accident.

"I was the District Conservationist for the USDA Soil and Water Conservation District," Meares said. "Now, I work for the USDA-NRCS (Natural Resource Conservation Service) but as a Resource Coordinator with Resource Conservation and Development, which takes in a five-county area. Now, I work with municipalities and groups rather than individual landowners as I did in the beginning. David Greene was on the New Hanover Soil and Water Conservation District (NHSWCD) board. He was having a conversation with Whitey Privatte and asked why he didn't give 3 acres he owned on the island to the district. But Whitey indignantly said it was 53 acres, not 3 acres."

Privatte did donate the 53 acres of spoil area near the center of the island to the district in 2002. Once NHSWCD owned the first 53 acres, Meares said Bruce Watkins, who was working as a consultant with N.C. Coastal Land Trust at the time, told her other pieces would fall into place. "Bruce was right," Meares said of that conversation. "I thought we could use it for education or something else. I became optimistic that we could really bring many of the rest of the island tracts into public ownership."

The next big island piece was acquired through a local realtor named Paul Nelson. As real estate prices boomed, the owner of the 158-acre George Madison Tract decided to sell it. "In 2003, an anonymous donor gave half the $120,000 purchase price of the 138-acre George Madison Tract, and the Town of Leland gave the other $60,000 after the town officials learned about it through an article in the local newspaper," Meares said. "Now, NHSWCD co-owns the tract along with the town."

In 2003, Eagles Island property owner Joan Grainger heard about the preservation effort and simply donated two tracts she owned, totaling 54 acres on the south of U.S. 74-76, the opposite side of the highway from the first two acquisitions.

A very large piece of the puzzle was acquired when the 242-acre V. A. Creech Jr. Tract was purchased in 2008. I knew V. A. Creech Jr. from past business dealings and, as one of the coalition members myself, approached the landowner to negotiate a purchase contract. But the property was already under contract to another potential buyer. That contract with the original buyer was never executed, so a contract for sale of the property to the NHSWCD was negotiated.

"We held meetings to discuss the possibility of having private donors contribute to buying the Creech Tract," Meares said. "But eventually, we acquired it through a grant provided by the North Carolina Natural Heritage Trust Fund (NCNHTF) in 2008."

For technical reasons, a county agency could not take ownership of the property since it was purchased with the NCNHTF monies. Therefore, the title was transferred to the North Carolina Division of Soil and Water Conservation, rather than the county conservation district.

The Creech Tract served to bring together the various parcels already owned by coalition partners. While the initial tracts had road frontage, making them very important, the Creech Tract was significant because it doubled the size of coalition-owned properties and tied them together.

Until this point, the N.C. Wildlife Resources Commission had expressed little interest in helping the Eagles Island preservation effort because there was no readily

> "From the outset, preserving traditional uses such as hunting, fishing, nature observation, boating and paddling was a primary goal of the coalition."
>
> *– Marilyn Meares*

identifiable boundary and the parcels were not large and contiguous. But the large contiguous acreage brought together with the acquisition of the Creech Tract brought a heightened awareness of the possibilities, and commission biologists agreed to meet again with coalition members to explore the possibility of creating a game land or other management possibilities.

"From the outset, preserving traditional uses such as hunting, fishing, nature observation, boating and paddling was a primary goal of the coalition," Meares said. "But until we had a large contiguous area under public ownership, there really was not very much to manage."

Another large tract owned by Blue Sky Timber LLC was put up for sale. But, like the Creech Tract, it was under contract to another buyer.

"We began negotiations to acquire the 238-acre Blue Sky property," Meares said. But every time we tried to acquire the property, it went under contract again. Our timing was always off, it seemed."

But persistence paid off, and the Blue Sky Timber tract is currently under contract to NHSWCD. Funding is scarce, but Meares is hopeful of obtaining another grant. So far, mini-grants for appraisals and environmental assessments have been funded for the other tracts through the N.C. Clean Water Management Trust Fund. But larger grants for the price of any tract have been very difficult to secure. The alphabet soup of agencies and entities involved shows the Eagles Island effort is truly a who's who of local, state and national agencies, organizations and dedicated individuals.

Bringing groups and funds together

On Oct. 8, 2008, several coalition members boarded *Lorelei,* a tour boat owned by Doug Springer, the Riverkeeper for Cape Fear River Watch. Lorelei's passengers included Bill Hart, supervisor of NHSWCD; Jennifer Braswell, director of community conservation for NHSWCD; Bill Farris, Leland town manager; Neil Brooks, Leland's manager of parks, recreation and environmental programs; Tony McEwen, representing U.S. Rep. Mike McIntyre; Tancred Miller of N.C. Division of Coastal Management; and Dawn York, who received a TogetherGreen Fellow grant involving Eagles Island from Audubon North Carolina.

"Today we are bringing interest groups together," Meares said. "The Blue Sky grant application was written through Tancred Miller's office, and Doug is new to River Watch. Our next challenge while continuing to acquire easements and properties is putting together a cohesive management plan, which includes more of the southern part of the island. If we get the money for the purchase of the Blue Sky Tract, the coalition will have put together most of the island north of U.S. 74-76 and west of U.S. 421. We want to include at least Audubon, Natural Heritage and the N.C. Wildlife Resources Commission in future management discussions. I envision it as a really special place people can be proud of because it's the front door to Wilmington and Leland. We hope to get a piece of high ground for building an educational center. Securing funding is the most important thing for the Blue Sky piece because our contract runs out in June 2009. If we can't get a grant by then, we are hoping the contract date can be extended."

Meares applied for a Coastal Estuarine Land Conservation Grant through the National Oceanic and Atmospheric Administration (NOAA). She said the Eagles Island-Blue Sky Timber grant application was ranked 15 out of 46 applications and was the only one ranked from North Carolina.

"There's only $15 million available, and if funding for the first 14 projects will take $20 million, the Blue Sky Tract purchase won't be funded," Meares said. "Unless Congress puts more money into the grant process, we may not see that money this year. We've also made a grant application to the N.C. Clean Water Management Trust Fund."

New Hanover Soil and Water Conservation District Leads Eagles Island Preservation and Management Effort

Bill Hart, supervisor of the New Hanover Soil and Water Conservation District, explained why and how NHSWCD became involved with the Eagles Island project:

"Soil and Water Conservation Districts are special purpose districts the General Assembly authorized," Hart said. "We have a responsibility for conserving the soil and water resources of the state. Historically it's been a farmer-oriented program, providing technical assistance to farmers since the 1930s. It was an exercise in local governments putting programs in place on the ground. But as North Carolina has become more urbanized, especially in densely populated counties like New Hanover, our role is shifting more to programs like backyard conservation programs, runoff control and other urban problems rather than agricultural problems. Of course, other districts may still deal with agricultural cost-share programs and other similar programs because they still have agricultural lands."

NHSWCD operations are funded mainly through City of Wilmington stormwater taxes, grants from New Hanover County and a share of the state agricultural cost share programs.

"The driving force for the district's involvement with Eagles Island, other than the first piece of private land essentially falling into our laps, is protecting the gateway to the city. As long as the district owns the land on both sides of U.S. 74-76, there won't be any billboards or other human presence. We recognized it was an extraordinarily unique ecosystem that also makes outdoor recreational opportunities immediately available to the city of Wilmington. Now we actively pursue properties and engage other property owners regarding the management of the island."

> "Eagles Island has the largest area of tidal freshwater marsh in North Carolina. I would like to see it looked at as a really special place that people are proud of. It's right outside Wilmington's front door and is extremely important not only for recreation and natural history, but for its cultural history.
>
> – *Bill Hart*

The N.C. Department of Transportation, N.C. State Ports Authority and U.S. Army Corps of Engineers are other government agencies that own Eagles Island properties. Most of the high ground is on the east side in New Hanover County, while most of the lowlands are located on the Brunswick County side. Touching the northeastern extent of coalition properties is the N.C. Department of Transportation tract that coalition members are hoping can be brought into an overall management plan. Adjoining coalition property on the northwestern corner is a privately owned tract that is the only remaining tract (aside from the Blue Sky Tract) located north of U.S. 74-76 and west of U.S. 421 that is not under public ownership. The coalition plans to contact the owner to see if that property can be acquired, placed under an easement, or otherwise protected under a mutually beneficial management plan.

Dawn York may be the coalition's latest torchbearer, lighting the way where Meares once began stumbling toward success by essentially groping in the dark after acquiring a single piece of property. York works as a coastal biologist for a company called Coastal Planning and Engineering that primarily manages beach nourishment projects and is also on the board of directors of Cape Fear River Watch. After an initial meeting with Meares and Springer four years ago, she secured the Audubon grant through the organization's TogetherGreen Fellow program. The grant provided $10,000 plus a weeklong training seminar, with implementation of York's project by August 2009.

"I am working on a long-term conservation management plan for the entire island for the first time," York said. "It's a natural progression because the land had to be acquired first. I recently contacted the U.S. Army Corps of Engineers and they are keenly interested in being involved. The Corps has an ongoing maintenance dredge spoil operation associated with the Wilmington Harbor project and their property is very significant from a wildlife standpoint. Their spoil areas attract many species of waterfowl, shorebirds and other wildlife."

York said her desire to become involved as a volunteer was inspired by the efforts and success of others, making her want to take on the personal challenge. She had also once performed studies on the Cape Fear River in the vicinity of Eagles Island as a University of North Carolina graduate student, bonding her inextricably to the river and the beauty of Eagles Island.

"I'm very excited because I thought the biggest challenge would be the Corps," York said. "But they have been very willing to cooperate and they were also looking for an answer to the long-term management of their property as well as environmental impacts."

York has also spoken with representatives of the N.C. State Ports Authority, which has a large piece of property of approximately

Names of Eagles Island Coalition Members Make Alphabet Soup

Initially, and unofficially, called the Society for the Preservation of Eagles Island, a grassroots group of private citizens interested in preserving Eagles Island formed for the purpose of obtaining some financial backing from those individuals. Later, the society became what is now referred to the Coalition for the Preservation of Eagles Island, expanding to include many agencies and groups. Included in the coalition are New Hanover Soil and Water Conservation District, N.C. Department of Environment and Natural Resources (NCDENR), N.C. Division of Soil and Water Conservation (NCDSWC), Cape Fear Resource Conservation and Development (CFRC&D), Town of Leland, Audubon North Carolina, N.C. Clean Water Management Trust Fund (NCCWMTF), N.C. Natural Heritage Trust Fund (NCNHTF), N.C. Wildlife Resources Commission (NCWRC), N.C. Coastal Land Trust (NCCLT), The Nature Conservancy (TNC), Cape Fear River Watch, Inc. (CFRW), Land Management Group Inc., Sierra Club, Lower Cape Fear River Program/UNCW Marine Science Center, U.S. Army Corps of Engineers (USACE).

Other property owners and potential coalition members include N.C. Department of Cultural Resources (NCDCR/USS Battleship North Carolina Memorial), N.C. State Ports Authority (NCSPA) and N.C. Department of Transportation (NCDOT).

THE NORTH CAROLINA STATE ARCHIVES

119 acres on the western side of the island, south of U.S. 74-76 and across the Brunswick River from the Town of Belville.

"The State Port representatives said they may use their property on Eagles Island as a mitigation site for work done in the future construction of a new State Port container facility proposed for Southport," York said. "But as with the NCDOT mitigation site, it can still be considered in an overall management plan for the entire island."

Bill Hart concurs with York's vision that the next challenge is forming a cohesive management plan for the entire island. "We would like to incorporate the entire island in the plan including the southern part, which is currently owned by many other people and businesses," he said. "Eagles Island has the largest area of tidal freshwater marsh in North Carolina. I would like to see it looked at as a really special place that people are proud of. It's right outside Wilmington's front door and is extremely important not only for recreation and natural history, but for its cultural history. Some restoration could be done, as well as building a welcome center or educational center perhaps on the Battleship Memorial property . . . We could originate paddle tours of the island and erect camping platforms and otherwise improve access."

In the 19th century, ditched-and-diked rice fields were common on Eagles Island and many other sites along the Cape Fear River.

Hart said the cultural history is written in the old docks, pilings, boilers and hulls sticking up along the island's eastern waterfront across the Cape Fear from Wilmington. Side by side with the looming U.S.S. North Carolina and active tugboat and other current maritime operations, the relics constitute an important part of Eagle Island's irresistible drawing power.

"This was the world capital of the naval stores industry," Hart said. "It was also the center of a very strong rice industry. Both of these industries relied on black slave labor, which is an important part of our history and deserves documentation and preservation. Without slave labor, these industries could not have existed. (See "Carolina Gold," Jan. 2001.) Erecting replicas of the old buildings might be a way to preserve their contribution and history before it is lost. The Eagles brothers, for whom the island is named, had

a royal charter to occupy the island in the 1700s and they made the first significant changes to the landscape by constructing dikes, water control structures and ditches for rice culture.

"Since then, the island has hosted Civil War boat works and other ship building activities, a mothballed fleet of World War II Liberty Ships, as well as current ship maintenance, dredging operations and tourism facilities. There was also a railroad on the island. There have been several proposals for intensive, high-rise residential developments across the Cape Fear River from Wilmington's downtown and this type of development must be carefully considered because of its potential impacts on wildlife and archaeological resources."

The Town of Leland may seem an unlikely partner, until the observer takes in the scenery from the center of town. Leland Town Manager Farris said his town, like Wilmington, considers Eagles Island its front yard.

"Marilyn Meares' group had some money for buying property and were looking for support," Farris said. "The council ultimately became involved and was very glad to have helped protect this unique resource. The overall management of Eagles Island is an important component to Leland's proper management and development. Our ownership stake is certainly an asset because it gives us a place at the table we may not have necessarily had in the overall management plan. Most of the island is in Brunswick County, so we annexed the property we co-own with NHSWCD, making them part of the town of Leland.

"From my personal perspective, when you actually look at Eagles Island from a water's eye view, it's simply breathtaking and it's all right here in this highly urban area," Farris said. "The town recently built a public access area on Sturgeon Creek, which gives easy access to the island. Eco-tourism and heritage tourism are part of the town's development strategy and we are extremely happy to have such a splendid resource so nearby." ⬘

Mike Marsh, a freelance outdoors writer living in Wilmington, is a frequent contributor to WINC.

A Personal Perspective

One morning during the winter of 1991–92, I was hunting ducks in the marsh complexes of Eagles Island. As the daylight sifted through the Spanish moss-draped cypress trees, I was amazed at the incredible splendor of the sunrise. The sunlight and clouds above and their mirror images reflecting off the water where my decoys were set held me spellbound. I had seen thousands of sunrises, but never one with such resplendent color.

Through a bit of research, I learned that the heightened colors of pinks, oranges, blues and grays had been created by the particles and gases ejected into the atmosphere by an eruption of Mount Pinatubo, which is located in the Philippines. The next day, I returned with my camera. Becoming an outdoor writer and photographer at that time was just an idea, no more than a hazy pipe dream. But my wife, Carol, without my knowledge, entered the photo in the Brunswick County Parks and Recreation Department's photo contest the following spring. The photo received first place, and was honored by hanging in a Southport art gallery during the town's annual Robert Ruark Festival. That beautiful photo, "Sunrise on Alligator Creek," became the cover art of my first and favorite book, "Quest for the Limit, Carolina Hunting Adventures." A large print hangs in my living room, where it continues to inspire all who view it.

As the coalition member most familiar with the island's intricacies and subtleties through many years of navigating its hidden channels in small boats, I submitted lists of wildlife species I have observed for various grant applications. I also personally approached V. A. Creech Jr., who generously agreed to sell his property to the New Hanover Soil and Water Conservation District so it could be preserved and protected for the public to enjoy in perpetuity. Michael Murchison, a Wilmington attorney, acted as the closing attorney at no charge. He is one of many individual volunteers who are making the preservation of Eagles Island a reality.

–Mike Marsh

MIKE MARSH

A fly fished slowly around brush or snags can result in crappies being brought into the boat.

Crappies ♥ Flies

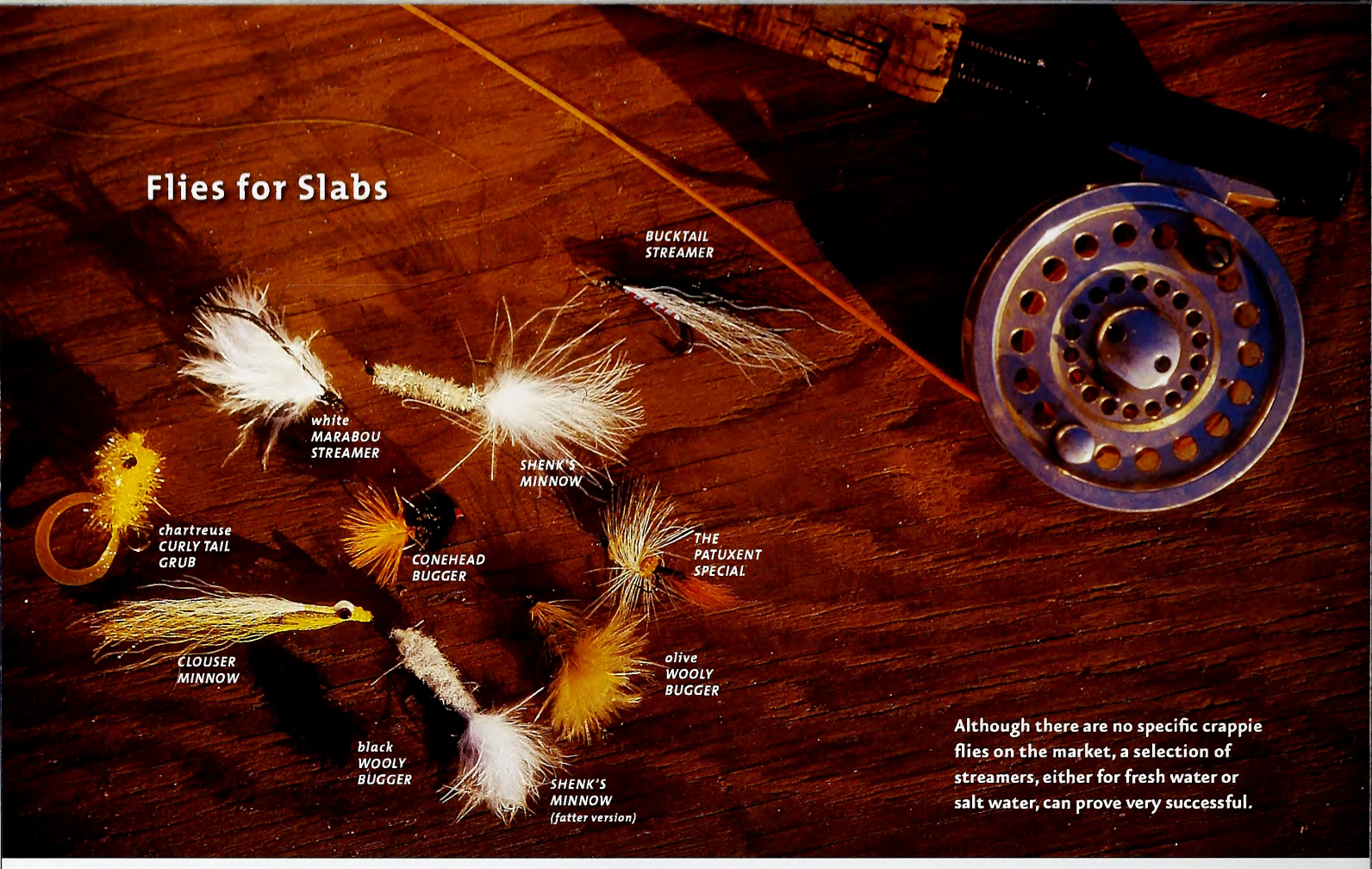
written by Jeremy Grady | photographed by F. Eugene Hester

With the right fly and the right technique, you can have a blast catching crappies around brush piles in the spring on a fly rod.

Many anglers don't associate crappies with fly-fishing. At times, fly rods have been used effectively with spinning reels to enable an angler to drop a jig down into a brush pile. I'm talking about using a full fly-fishing outfit—fly rod, floating fly line, leader and small streamer.

It makes sense that crappies would love flies, because fishermen have been catching them on marabou jigs for decades. A marabou jig is nothing more than a heavily weighted fly that can be fished with conventional tackle. Flies are probably effective because they offer a lifelike, vulnerable presentation. There's an ongoing debate among diehard crappie fishermen about whether to use jigs or minnows. Flies are tied like a jig but don't sink like one, yet they swim like a minnow. The real secret to success is getting the fly to crappies, because sometimes they're deep or they're holding tight in heavy brush. At such times, there are other methods that are better for catching them. But sometimes they venture out, and if they're within several feet of the surface, they can be caught very effectively on flies.

Usually in spring, crappies will move on the banks to spawn. This is a good time for the fly-rodder because fish are shallow and hungry. An angler can catch good numbers and some nice-sized fish. In my area, the



Although there are no specific crappie flies on the market, a selection of streamers, either for fresh water or salt water, can prove very successful.

foothills, mid-April is about right. Look for areas that have brush and concentrate around the outer edges and between piles. If the fish are there, and they're shallow enough, they will usually eat the fly. This is also a good time to catch white bass and yellow perch.

I remember one particular spring day when crappies were spawning in shallow water. We started the day bass fishing and were not having very good luck. I noticed boats stationed on a particular stretch of bank that had a lot of brush. Each time we jetted back and forth, the boats remained in the same places. I asked my friend Jason what he thought they were doing, and he said that he heard the crappie had been biting lately. We continued our pursuit of bass, and our luck remained the same. The next time we passed by, a couple boats were gone, so in a futile effort to salvage a trip, we pulled in.

Usually fish take the fly when it's falling slowly. Often times you don't see the take. You may feel a tap, or just feel the fish on. It's important not to set the hook hard—they aren't called "papermouths" for nothing.

Jason started casting a little chartreuse-and-red plastic jig, and I started throwing a silver Panther Martin. A couple casts later, Jason was into a fish, a nice white crappie about 12 inches. I had a couple bumps on the spinner, but then nothing. Jason caught a couple more fish, and I noticed that he wasn't fishing very deep, so I had to try a fly. I had some flies tied specifically for crappies left over from the season before, so I knotted a chartreuse wooly bugger to the tippet.

Once the fly was good and soaked, it began to sink. When the fly was out of sight, the strike occurred. The water was fairly dingy, which limited seeing the fish eat the fly. You could probably see about a foot down, and the crappies were right below that, loving that chartreuse wooly bugger. I ended up catching some 11- and 12-inch fish, and eventually beat the little jig that Jason was using. The Panther Martin was definitely faster than the jig, and the jig definitely faster than the fly. We don't know how the anglers did before we got there, or if the crappies simply started biting. But on this day, the fish definitely liked the fly over the other artificials we used.

Another good time to catch crappies is during hydroelectric generation. The waters I fish the most are on the Catawba chain of lakes, where Duke Power dams release water to generate electricity. When this happens, bait fish school up and larger fish feed on them. Any fish that eats minnows or shad

will take advantage of this, including crappies. A good sign that this is happening is seeing white bass, striped bass and largemouth bass feeding on these baitfish.

The first time I stumbled on targeting crappie for the fly was during a hydropower release. After a day of slow bass fishing mixed with some bluegills on poppers, we started noticing fish feeding sporadically beyond the boat. They were too far for us to reach from where we were sitting, but Jason started casting a chartreuse rooster tail toward the bank. I continued to throw a popper with no avail. He soon hauled in a 10-inch crappie. He continued, and it seemed like every cast he either got a strike, or caught a fish. "Boy, you better tie on a spinner" he gloated.

I didn't want use a spinner just yet. However, I did have some small marabou streamers in my bluegill fly box, and I frantically tried to tie one on in the midst of the action. Just like during the spring trip, the strike would occur once the fly began to sink out of sight. The first couple times I thought I had a strike, I set too hard and got nothing. I know these were only 10-inch fish, but I couldn't help but get excited. I tried to calm my nerves, and I finally connected. I caught several more, which added to the thrill. I didn't catch more than Jason with his spinner, but I had more fun.

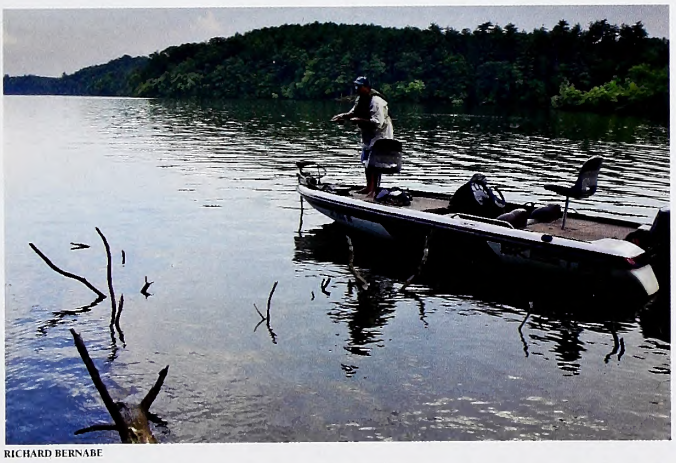
The key for working the fly is fishing it slowly. Crappies primarily are looking up for food, and they can't resist a slowly falling fly. I usually let it let it sink a couple feet, and they'll come up to eat it. Cast the fly around the brush and let it sink for a couple seconds. In my casting hand, I'll hold the fly line against the grip and slowly raise the tip of the fly rod. This way I have a straight line to the fly. Then slowly lower the rod tip, allowing the fly to sink. Many times, I begin to raise the fly rod when I feel the fish on.

Instead of a sink-tip fly line, I use streamers that are slightly weighted. If I can see the brush, I sometimes fish it just fast enough to prevent it from hanging up. I always let the fly sink off the end of the brush pile for several seconds. Here I can afford to let it sink and not have to worry about it hanging up. This way I can get deeper, and maybe hook a bigger fish. Sometimes they may be congregated there. Pay close attention to how you caught the first fish. If you can duplicate the same technique, you may develop a pattern and end up catching a lot of fish in a short amount of time.

Usually fish take the fly when it's falling slowly. Often times you don't see the take. You may feel a tap, or just feel the fish on. It's important not to set the hook hard — they aren't called "papermouths" for nothing. A short, quick hook set is all that's needed, something like setting the hook on a trout if you were using a 2-pound tippet.

When you can see the take, you may not see the crappie. Instead, all you see is the fly simply disappear. This means the fish has engulfed it. This is why I like flies with chartreuse: Fish like it, and I can see it. I rarely see the actual fish, which seem to blend in with the murky water. Rarely are they hooked in the lip. Almost always the entire fly is inside the fish's mouth, and sometimes close to the throat. This is a great reason to bend the barb down on the fly.

If you do any crappie fishing, you will hang up sooner or later. If the fly is snagged within a foot or so of the surface, sometimes I can unhang it with a roll cast. If that doesn't work, or the fly is deeper, then you might have to go in and get it. I usually retrieve the fly instead of breaking it off. I ease the boat in slowly, and strip all the line in to where I can reach the fly with the rod tip and try to poke it off. For fear of spooking fish, I may go to another spot or back off from the brush and wait a few minutes. I've found the fish eventually start biting again.



RICHARD BERNABE

There aren't any designated crappie flies on the market. I've found some trout streamers, minnow imitations, and even some saltwater flies that will do just fine. Crappies love color combinations of white, chartreuse, pink, black, red, olive, yellow and some sort of silver flash — all colors that are found on baitfish. Marabou wing streamers tied with these color combinations do very well. If you know that a certain jig color combination that works well on a particular lake, and if you know a fly- or jig-tier, maybe they can make some up for you. Other streamers that work well are black ghost, gray ghost, Jannsens minnows, chartreuse or white wooly buggers, in sizes in six and eight, or from 1 to 2 inches.

Another fly that can be good for crappies is a Gotcha. The Gotcha is a saltwater fly tied to imitate a shrimp, but it resembles a small minnow as well. I discovered it a couple years ago when I was tying some flies for my friend Jim Dean to take on a trip to Belize. I always make a couple extras when tying to see how they look in the water and if they may catch fish here. One positive for a Gotcha is that the hook rides up, causing fewer hang-ups. Another is that because of the bead chain eyes, it falls a little faster, creating a slight jigging action, and it's like fishing a small jig with the fly rod. Also, Gotchas can be tied in any color combination and size desired.

Any 7- to 9-foot fly rod that you would use for bluegills or trout will do fine for crappie. A four- to six-weight, floating fly line matched with a leader the length of the rod, tapering down to eight pounds will suffice. I advise you to keep a check on the tippet. Fishing in brush will put some abrasions in it. It seems like any time I'm fishing for bluegills or crappies, a 3-pound largemouth snatches the fly when I'm not expecting. Be ready.

Fly-fishing this way will catch just about any fish that eats small minnows, and it can be particularly lethal on crappies. Go ahead and string up a fly rod with a small streamer. If the conditions are right, you might be pleasantly surprised.

Jeremy Grady is a freelance writer from Morganton and an occasional contributor to WINC.

When it comes to North Carolina's winged scavengers, ugliness is only skin deep.

Big, Bald, Beautiful Vultures

written by Terry Krautwurst / illustrated by Consie Powell / nature activity by Anne M. Runyon

When you think of a vulture, does the word "beautiful" come to mind? Vultures, after all, are scavengers—they eat the remains of dead animals. For centuries, we've associated vultures with death. With dark feathers, oddly bald heads, heavy hooked beaks and beady eyes, vultures are not usually considered pretty birds. But take time to look more deeply, and you'll discover the beauty in these winged beasts.

LOOKS CAN DECEIVE

North America's three "New World" vultures—the turkey vulture, black vulture and California condor—were once considered raptors, members of the same order as European "Old World" vultures as well as hawks, eagles and other birds of prey. But recent genetic evidence has shown that New World vultures are actually members of the stork family.

California condors are critically endangered and live only in scattered pockets of California and the Southwest. Turkey vultures range throughout the continental United States, while black vultures are limited to the Southeast, north to New Jersey. In North Carolina, turkey vultures and black vultures share territory from the coast to the mountains, although black vultures are somewhat uncommon in the Piedmont.

Vultures sometimes fly alone, but more often they travel in groups, spiraling together up and down in the sky.

BLACK VULTURE

You can easily tell turkey and black vultures apart by looking at their heads. An adult turkey vulture's is red, the black vulture's dark gray or black. Black vultures are also slightly smaller but heavier and stockier.

TURKEY VULTURE

BLACK VULTURE

Turkey vultures, with 6-foot wingspans, fly with their wings held slightly upward in a V pattern, and teeter from side to side as they glide, as though they're balancing on a tightrope. Black vultures hold their slightly smaller wings flat and steady, and have shorter, square tails.

TURKEY VULTURE

GRACEFUL GLIDERS

On the ground, vultures seem awkward. But when gliding high in the sky, vultures are all beauty and grace.

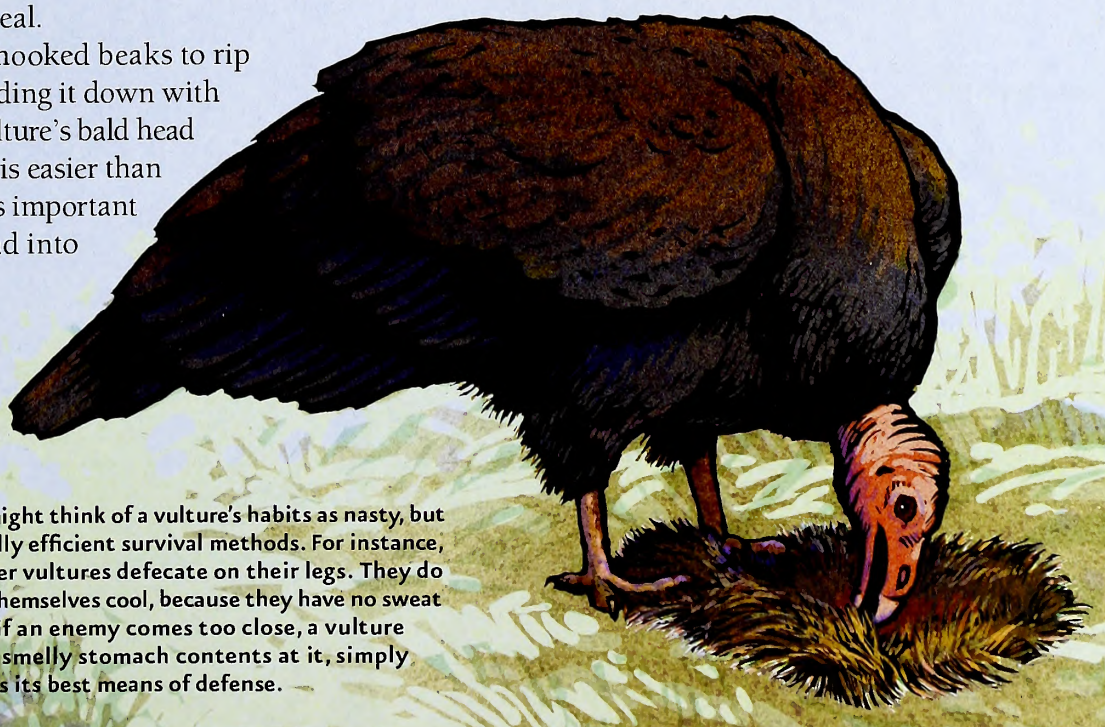
Like raptors, vultures soar by catching the winds pushed upward by mountains, trees or buildings, or by riding columns of rising warm air called thermals. Thermals serve as invisible elevators, lifting vultures to high altitudes quickly. Once aloft, a bird can stay in a thermal, riding it in spirals, or fly or glide away.

Vultures aren't strong fliers, but they're among the world's best soarers and gliders. Watch a vulture soar and you will see it spread its fingerlike wing-tip feathers, each of which acts like a tiny airplane wing to create more lift. Cruising and gliding from one rising thermal to another, a vulture can stay airborne all day, traveling more than 100 miles while seldom flapping its wings.

MODELS OF EFFICIENCY

Vultures are beautifully designed, head to toe, for doing their job: finding and eating carrion (dead animals). They have keen eyesight, and can spot a meal while cruising high above open countryside. Unlike most birds, turkey vultures also have a sharp sense of smell and can sniff out a carcass hidden in dense forest by gliding just above the treetops. Black vultures hunt by sight alone and generally fly higher, watching not only for dead animals but also for turkey vultures that have already found a meal.

Vultures use their stout hooked beaks to rip meat off a carcass while holding it down with strong clawed feet. Even a vulture's bald head has a purpose: the bare skin is easier than feathers to keep clean. That's important for a bird that pokes its head into messy body cavities to eat.

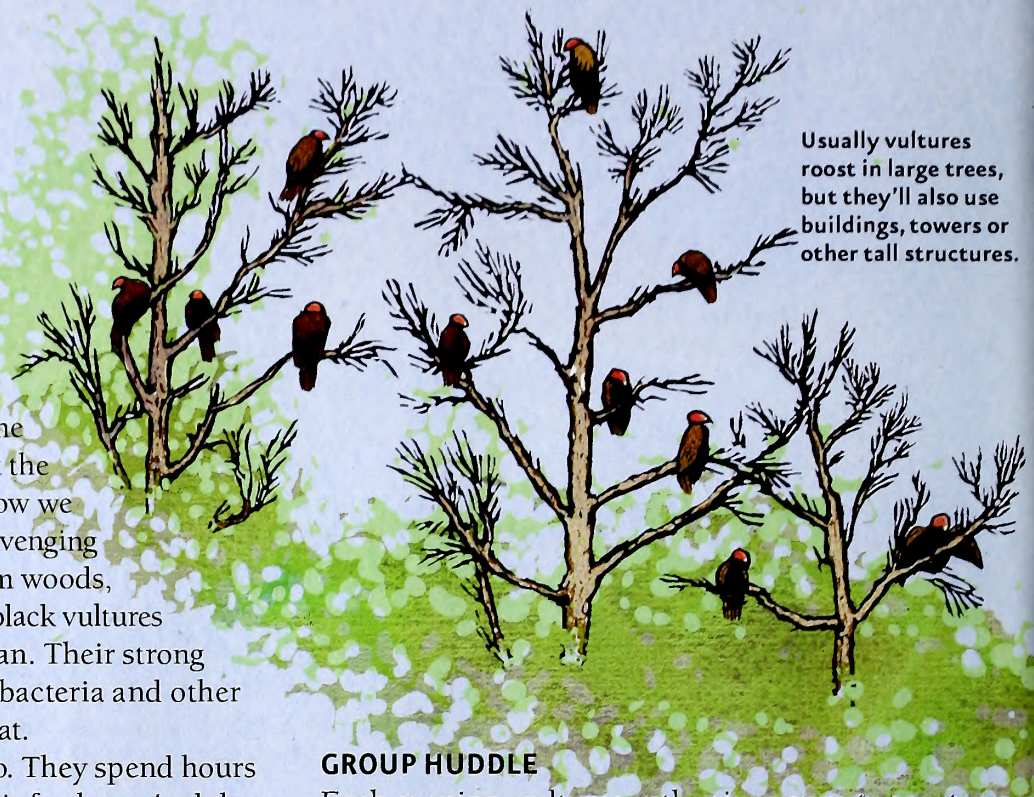


We humans might think of a vulture's habits as nasty, but they're actually efficient survival methods. For instance, in hot weather vultures defecate on their legs. They do this to keep themselves cool, because they have no sweat glands. And if an enemy comes too close, a vulture upchucks its smelly stomach contents at it, simply because that's its best means of defense.

PEACEABLE CLEANERS

Vultures don't deserve their bad reputations. Some native Americans call them "peace eagles," because they seldom kill prey. In the past, farmers trapped and killed vultures by the thousands because they thought the birds spread animal diseases. Now we know the opposite is true. By scavenging and removing dead animals from woods, fields and roadsides, turkey and black vultures help keep our environment clean. Their strong digestive systems actually kill bacteria and other disease organisms in rotting meat.

Vultures have tidy habits, too. They spend hours each day carefully preening their feathers. And they bathe in streams and lakes, wading into the water, dunking their whole bodies under, then hopping out and spreading their wings wide to dry in the sun.



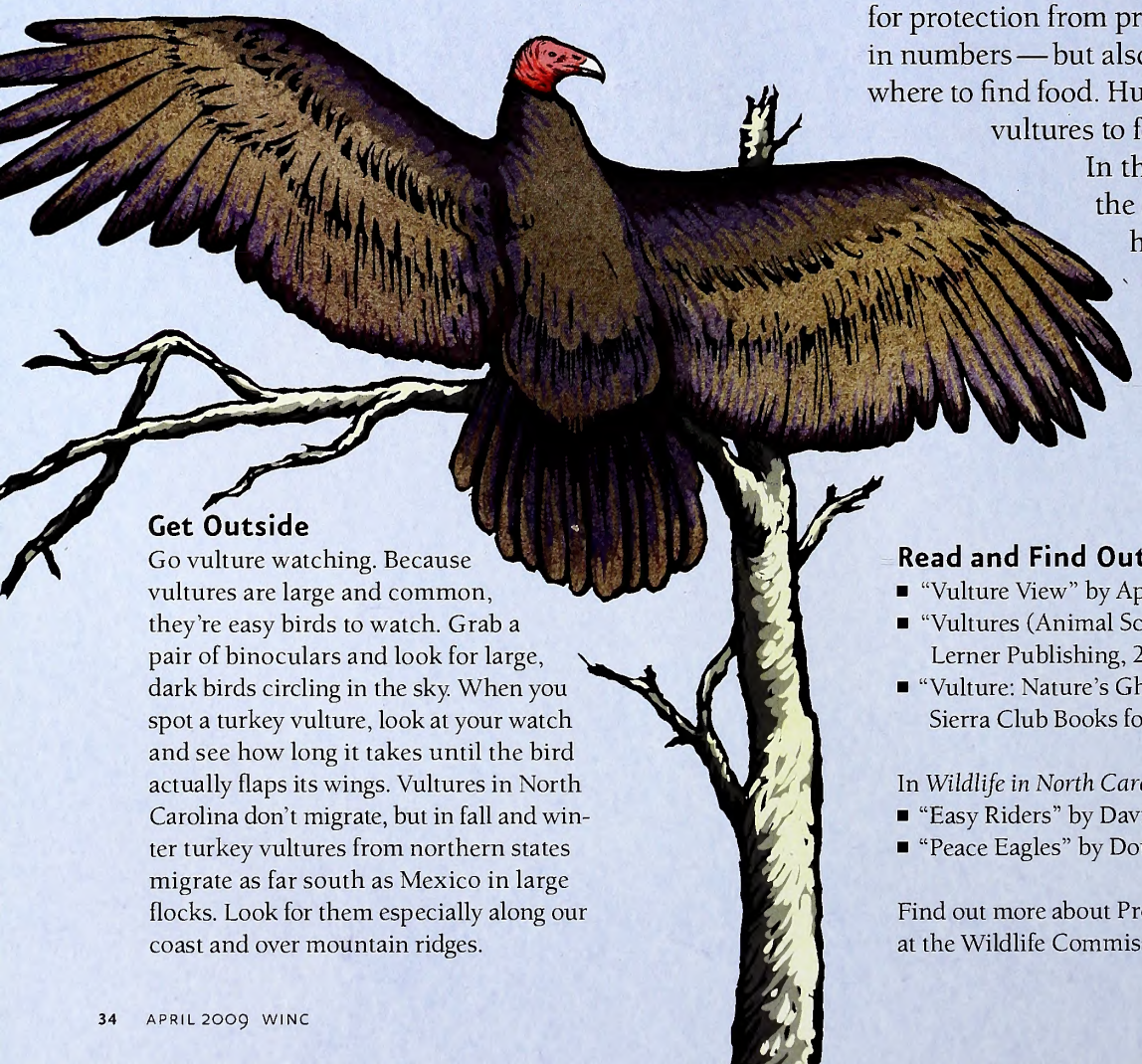
Usually vultures roost in large trees, but they'll also use buildings, towers or other tall structures.

GROUP HUDDLE

Each evening, vultures gather in groups to roost overnight. Often, dozens of vultures, both turkey and black, share a roosting site. Sometimes, hundreds roost together.

Biologists think that the birds roost together not only for protection from predators—because there's safety in numbers—but also to exchange information about where to find food. Hungry vultures can follow well-fed vultures to feeding sites.

In the morning, the birds wait until the sun has been up long enough to heat the air and create thermals. Then, one at a time, they spread their wings and with a few strong flaps catch a ride upward on a column of rising warm air, soaring into the sky to start a new day.



Get Outside

Go vulture watching. Because vultures are large and common, they're easy birds to watch. Grab a pair of binoculars and look for large, dark birds circling in the sky. When you spot a turkey vulture, look at your watch and see how long it takes until the bird actually flaps its wings. Vultures in North Carolina don't migrate, but in fall and winter turkey vultures from northern states migrate as far south as Mexico in large flocks. Look for them especially along our coast and over mountain ridges.

Read and Find Out

- "Vulture View" by April Pulley Sayre, Henry Holt, 2007.
- "Vultures (Animal Scavengers Series)" by Sandra Markle, Lerner Publishing, 2005.
- "Vulture: Nature's Ghastly Gourmet" by Wayne Grady, Sierra Club Books for Children, 1997.

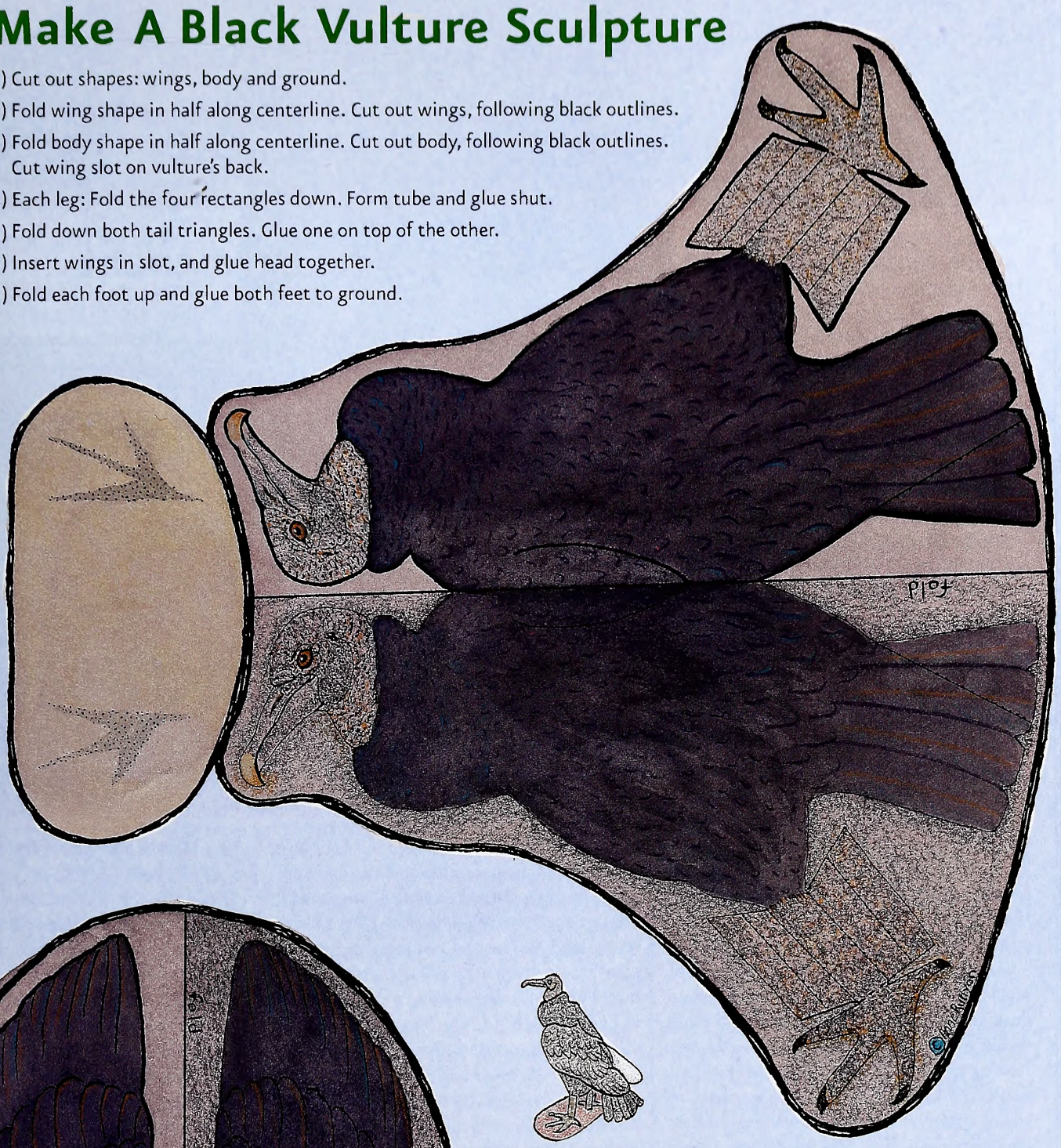
In *Wildlife in North Carolina:*

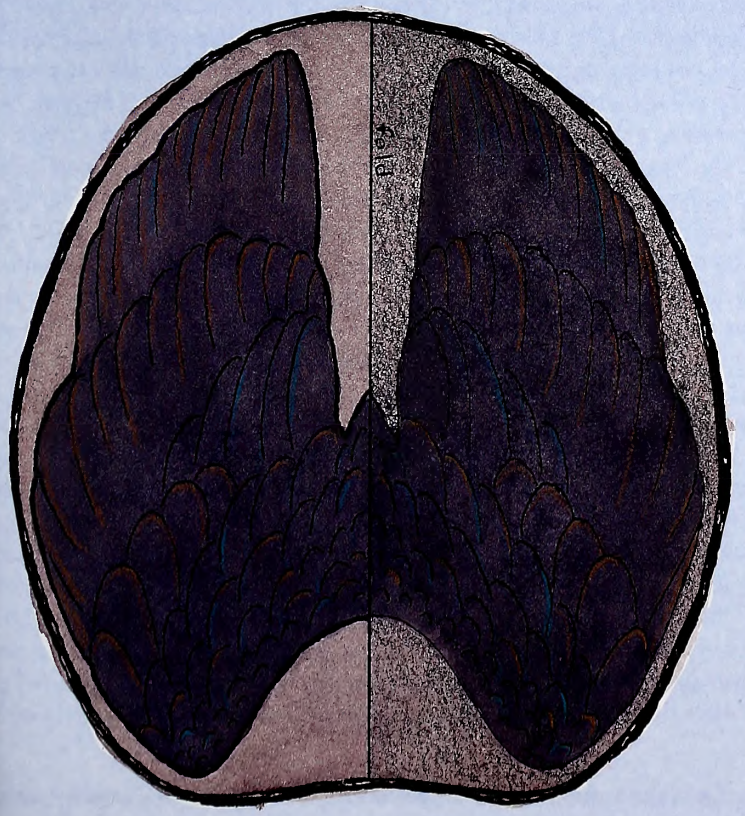
- "Easy Riders" by David Lee, August 1996.
- "Peace Eagles" by Doug Elliott, August 1990.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make A Black Vulture Sculpture

1) Cut out shapes: wings, body and ground.
2) Fold wing shape in half along centerline. Cut out wings, following black outlines.
3) Fold body shape in half along centerline. Cut out body, following black outlines. Cut wing slot on vulture's back.
4) Each leg: Fold the four rectangles down. Form tube and glue shut.
5) Fold down both tail triangles. Glue one on top of the other.
6) Insert wings in slot, and glue head together.
7) Fold each foot up and glue both feet to ground.





This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational use.

Climate Change Might Be Permanent

In a new scientific study led by the National Occanic and Atmospheric Administration (NOAA), scientists have concluded that climate change caused by future increases of carbon dioxide could be to a large extent irreversible.

The pioneering study, led by NOAA senior scientist Susan Solomon, shows how changes in surface temperature, rainfall and sea level are largely irreversible for more than 1,000 years after carbon dioxide (CO_2) emissions are completely stopped. The findings appeared during the week of Jan. 26 in the *Proceedings of the National Academy of Sciences*.

"Our study convinced us that current choices regarding carbon dioxide emissions will have legacies that will irreversibly change the planet," said Solomon, who is based at NOAA's Earth System Research Laboratory in Boulder, Colo. "It has long been known that some of the carbon dioxide emitted by human activities stays in the atmosphere for thousands of years, but the new study advances the understanding of how this affects the climate system."

The study examines the consequences of allowing CO_2 to build up to several different peak levels beyond present-day concentrations of 385 parts per million and then completely halting the emissions after the peak. The authors found that the scientific evidence is strong enough to quantify some irreversible climate impacts, including rainfall changes in certain key regions, and global sea level rise.

If CO_2 is allowed to peak at 450 to 600 parts per million, the results would include persistent decreases in dry-season rainfall that are comparable to the 1930s North American Dust Bowl in zones including southern Europe, northern Africa, southwestern North America, southern Africa and western Australia.

The study notes that decreases in rainfall that last not just for a few decades but over centuries are expected to have a range of impacts that differ by region. Such regional impacts include decreasing human water supplies, increased fire frequency, ecosystem change and expanded deserts. Dry-season wheat and maize agriculture in regions of rain-fed farming, such as Africa, would also be affected. Climate impacts were less severe at lower peak levels. But at all levels added carbon dioxide and its climate effects linger because of the ocean.

KEN TAYLOR / NCWRC

Coastal areas would be the first affected by rising sea levels.

"In the long run, both carbon dioxide loss and heat transfer depend on the same physics of deep-ocean mixing. The two work against each other to keep temperatures almost constant for more than a thousand years, and that makes carbon dioxide unique among the major climate gases," said Solomon.

The scientists emphasize that increases in CO_2 that occur in this century "lock in" sea level rise that would slowly follow in the next 1,000 years. Considering just the expansion of warming ocean waters—without melting glaciers and polar ice sheets—the authors find that the irreversible global average sea level rise by the year 3000 would be at least 1.3–3.2 feet (0.4–1.0 meter) if CO_2 peaks at 600 parts per million, and double that amount if CO_2 peaks at 1,000 parts per million.

"Additional contributions to sea level rise from the melting of glaciers and polar ice sheets are too uncertain to quantify in the same way," said Solomon. "They could be even larger but we just don't have the same level of knowledge about those terms. We presented the minimum sea level rise that we can expect from well-understood physics, and we were surprised that it was so large."

Rising sea levels would cause "irreversible ... changes in the geography of the Earth, since many coastal and island features would ultimately become submerged," the authors write.

Geoengineering to remove carbon dioxide from the atmosphere was not considered in the study. "Ideas about taking the carbon dioxide away after the world puts it in have been proposed, but right now those are speculative," said Solomon.

Saltwater Anglers Spend Big to Fish

Recreational saltwater anglers pumped more than $31 billion into the U.S. economy in 2006, with Florida, Texas, California, Louisiana and North Carolina receiving the largest share, according to a new study issued by The National Oceanic and Atmospheric Administration (NOAA) Fisheries Service.

KEN TAYLOR/NCWRC

At the national level, saltwater anglers are estimated to have spent $5.8 billion on trip-based expenses such as ice, bait and fuel, and another $25.6 billion on fishing equipment and durable goods such as fishing rods, fishing tackle and boats. The top five coastal recreational fishing states are Florida ($16.7 billion), Texas ($3.2 billion), California ($3.0 billion), Louisiana ($2.9 billion) and North Carolina ($2.0 billion).

One of the interesting aspects of the statistics is that North Carolina is the only Southeastern state in which spending by nonresident anglers has a greater impact than that by resident anglers. Nonresident fishermen spent $66.4 million less than nonresidents, but their spending generated the highest sales, income and employment impacts. The impact was greater because nonresident anglers spent considerably more than residents at service-oriented businesses, such as restaurants, supermarkets, convenience stores, hotels and for-hire fishing boats. Service-oriented businesses tend to generate higher economic impacts within a region than commodity-level purchases (i.e., fishing tackle purchases) because the entire demand for the services is supplied by local businesses.

In addition to quantifying angler expenditures, this study examines how these expenditures circulated through each state's economy and the national economy using a regional assessment. The $31.4 billion in total U.S. expenditures in 2006 contributed $82.3 billion in total sales, $39.1 billion to gross national product, $24 billion in personal income, and supported nearly 534,000 jobs.

The *Economic Contribution of Marine Angler Expenditures in the United States 2006* is available at www.st.nmfs.noaa.gov/st5/publication/marine_angler.html.

North Carolina Gets First Marine Protected Area

The National Oceanic and Atmospheric Administration (NOAA) has established eight separate marine protected areas (MPAs) encompassing a total of 529 square nautical miles in south Atlantic federal waters to shield deep-water fish species and their habitats from fishing.

All fishing for snappers, groupers, tilefishes, grunts, porgies and sea basses is prohibited throughout the protected areas, which are located off the coast from North Carolina to Florida. However, anglers will be able to troll for such fish as dolphin, billfish and tuna.

North Carolina's MPA is located about 55 nautical miles southeast of Southport and extends along the continental shelf in waters up to 1,000 feet deep. It has a rectangular shape and measures about 10 nautical miles by 15 nautical miles. (A nautical mile is approximately 1.15 statute miles.) The location, known as the Snowy Grouper Wreck MPA, is known to hold snowy grouper, gag grouper, speckled hind and red porgy.

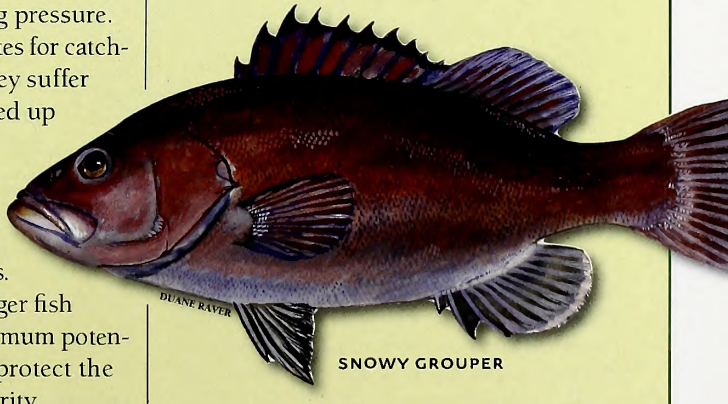
The South Atlantic Fishery Management Council proposed the action to NOAA's Fisheries Service as part of a larger management plan to protect these South Atlantic fish populations. "Marine protected areas are designed to provide long-term protection for our nation's natural resources," said Jim Balsiger, acting assistant administrator for NOAA's Fisheries Service. "These areas of the South Atlantic were chosen because they feature known spawning grounds and nursery habitats for deep-water fish, especially for snappers and groupers."

The marine protected areas are critical to the survival of more than 70 species of deep-water fish susceptible to fishing pressure. These fish are not good candidates for catch-and-release fishing because they suffer trauma when hooked and reeled up from great depths.

In addition, some species, such as snowy grouper, can live longer than 50 years and are the most productive spawners. It is important to protect the larger fish so they can spawn to their maximum potential, and equally important to protect the younger fish so they reach maturity.

The new protected areas range in size from 21 to 150 square nautical miles. In addition to the one off North Carolina, there are three off South Carolina, one off Georgia and three off Florida.

Commercial shark bottom longline gear is also prohibited in these areas because deep-water fish species are likely to be caught incidentally with this gear. All other types of legal fishing are allowed because those gear types are not likely to incidentally catch the protected species.



DUANE RAVER

SNOWY GROUPER

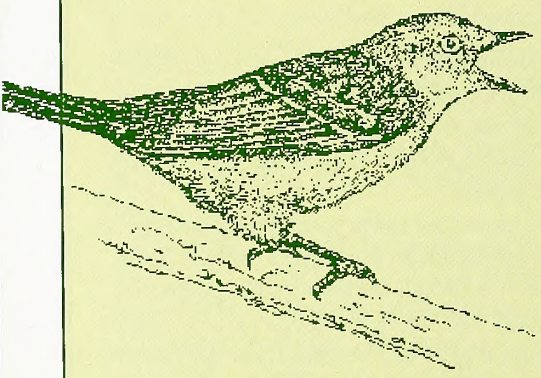
CALENDAR OF EVENTS

TUESDAY–SUNDAY, APRIL 14–19

Join the festivities and celebrate the shad run on Contentnea Creek at the 39th Annual Grifton Shad Festival. Most activities take place April 18–19.
Contact (252) 524-5168.
Visit www.grifton.com.

FRIDAY–SUNDAY, APRIL 24–26

Check out the 10th annual Southern Side-by-Side Spring Classic at Deep River Sporting Clays near Sanford. Competitions will be held for side-by-side shotguns of various gauges. Exhibitors include such gun makers as Atkin, Grant & Lang, Charles Boswell, FAMARS, Holland & Holland and Griffin & Howe.
Contact (919) 774-7080.
Visit www.deepriver.net.



SATURDAY, APRIL 25

Join an early celebration of International Migratory Bird Day with a festival from 9 a.m. to 3 p.m. at Blue Jay Point County Park in Raleigh.
Contact (919) 870-4330.
Visit www.wakegov.com/parks.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

BOW Schedules N.C. Events

Becoming an Outdoors-Woman (BOW), an international program of hands-on learning and outdoors experience, has scheduled five events in 2009 for North Carolina.

Instruction and participation offered through Becoming an Outdoors-Woman can include bird watching, camping and backpacking, canoeing and kayaking, nature photography, wilderness survival, outdoor cooking, stream ecology, rock climbing, shotgun and rifle marksmanship, and fishing, fly-tying and fly-fishing.

JODY DUGGINS/NCWRC

"The Becoming an Outdoors-Woman program is all about discovery," said BB Gillen, outdoor skills coordinator for the N.C. Wildlife Resources Commission, which offers the program in this state. "It's a chance to discover outdoor adventure, fun and friendship and to discover yourself. Both Becoming an Outdoors-Woman and Beyond BOW, its single-topic extension, are for women looking to expand their experience, not necessarily those who are experienced."

Becoming an Outdoors-Woman events for 2009:

APRIL 4:
Fly-Fishing Experience at the Pisgah Center for Wildlife Education near Brevard.

APRIL 17–18:
Game and Outdoor Cooking at Howell Woods Environmental Learning Center in Johnston County.

MAY 1–3:
Full BOW Weekend at Camp Rockmont near Asheville.

MAY 16–17:
Outdoor Skills Session at McDowell Nature Preserve in Charlotte.

JUNE 12–14:
Hunter Education and Archery at Howell Woods Environmental Learning Center in Johnston County.

Participation is open to women ages 18 and older. Registration is on a first-come, first-served basis, with a fee covering cost of materials and accommodations. Contact Gillen at (919) 218-3638 or bb.gillen@ncwildlife.org for more information or to register.

IN SEASON

This month, this season is open in North Carolina:

Hatchery Supported Trout Waters:
April 4, 2009, through Feb. 28, 2010.

Roanoke River Striped Bass Management Area:
Continues through April 30 unless closed by proclamation.

Youth Wild Turkey Day
(Male or Bearded Only): April 4.

Wild Turkey (Male or Bearded Only):
April 11–May 9.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2008–2009 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

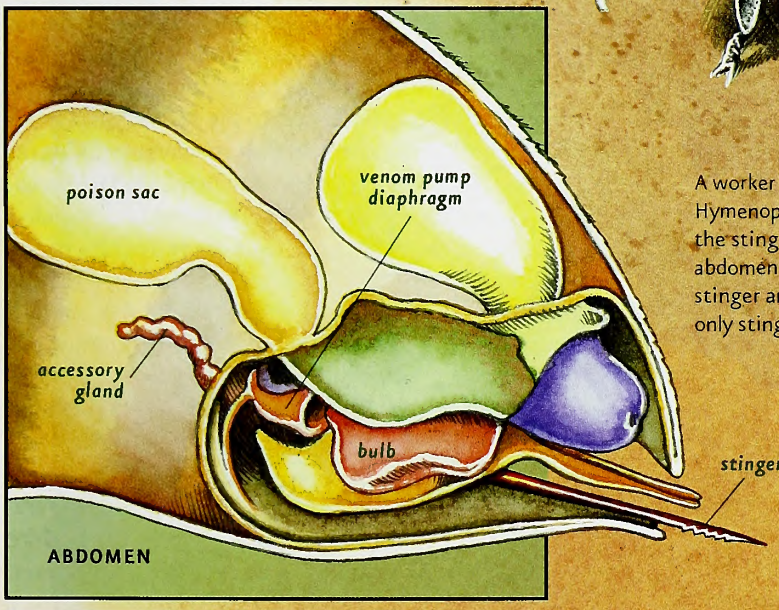
How Does A Honey Bee Sting?

written by Clyde Sorenson
illustrated by Jim Brown

A BEE'S STINGER ELICITS FEAR and loathing all out of proportion to the size of the fascinating little creature carrying the weapon. A bee's stinger is actually a highly evolved tool.

If you get stung, you've learned one thing about your assailant — it's a female. The stinger is actually a highly modified ovipositor — the structure most insects use to lay their eggs.

In most insects, the accessory glands associated with the ovipositor make glues or other substances that protect and secure the eggs as they're laid. In bees and other Hymenoptera (bees, ants and wasps), the accessory glands function as the venom glands that produce that burning cocktail.



A worker honey bee's stinger is barbed, unlike the stingers of most other Hymenoptera. When a worker stings an attacker (like you), the barbs lodge the stinger in the flesh, and the bee pulls away, ripping the end of her abdomen off. The poison sac, and the muscles that power it, go with the stinger and continue to pump venom for several minutes. A worker can only sting once, and dies shortly afterwards.

The stinger of the queen honey bee is unbarbed. She must be able to potentially sting multiple times to kill competing queens. As the only fertile female in the colony, the queen is the only one that lays eggs. Eggs slide past the stinger as she deposits them. Most other stinging Hymenoptera can sting multiple times, too.

Swine and Dine

written by Jim Dean

For many years, sometime between the first pink flush of redbuds and the full-dress parade of dogwoods, I would drive to Rocky Mount to celebrate the arrival of the new season while fishing for shad in the Tar River just south of the old airport.

JIM DEAN

The choice spots to cast your shad darts or small spoons were the short piers that jutted out into the river, and just before noon each day, the entire bank would fill with fishermen, many in business suits and muddy dress shoes, who had come straight from work. Directly across the river stood Bob Melton's Barbecue, wafting clouds of pig smoke amongst us.

The confluence of these enticements set up a daily drama of conflicting agendas. How much longer could we stand it before we gave up our prime fishing spot for a plate of barbecue and Brunswick stew? It was particularly hard on the lunchtime anglers who had only an hour to sample both. Sadly, Melton's succumbed to the floodwaters of Hurricane Floyd, greatly diminishing the joys of this particular rite of spring.

"The lure and lore of pig is an enduring part of every North Carolinian's DNA."

The lure and lore of pig is an enduring part of every North Carolinian's DNA. For me, having grown up in Halifax and Northampton counties, it is linked to frosty-breathed memories of hog-killings, fried fatback on crackling biscuits with navy beans served at predawn breakfasts, and hams hanging heavy in my grandmother's smokehouse. Yet, it was my first wood-smoked, pit-cooked chopped barbecue and slaw sandwich on a bun as soft as a baby's butt that made me truly understand why swine rhymes with divine. My grandfather bought it for me from a roadside joint when I was about 8 years old.

Over the 60-some years since that seminal event, I have chased the barbecue muse throughout North Carolina, and beyond. In the interests of full disclosure, I have to admit that my early experience was confined to the vinegar and red pepper style common in the East, and I didn't become acquainted with the western or Lexington-style barbecue, which includes ketchup in the sauce, until I was in my late 20s. But as much as I anticipate stopping at Wilber's in Goldsboro or some other Coastal Plain purveyor of pig, I also have fond memories of those red-slaw, pulled-pork platters from a tiny place called Jack's south of Burlington where I first worked as a cub reporter for the *Times-News* fresh out of college in the 1960s.

Nor I am foolish enough to take sides in the enduring debate regarding the superiority of one over the other. I will simply say that my favorite North Carolina barbecue is the one I am just now sitting down to eat, although I do prefer that the pig committed to this endeavor be smoked over a wood fire. Other than that, I will point out that it runs counter to good manners to argue with others about matters of personal taste, even if they're wrong. It's their business, after all, bless their hearts.

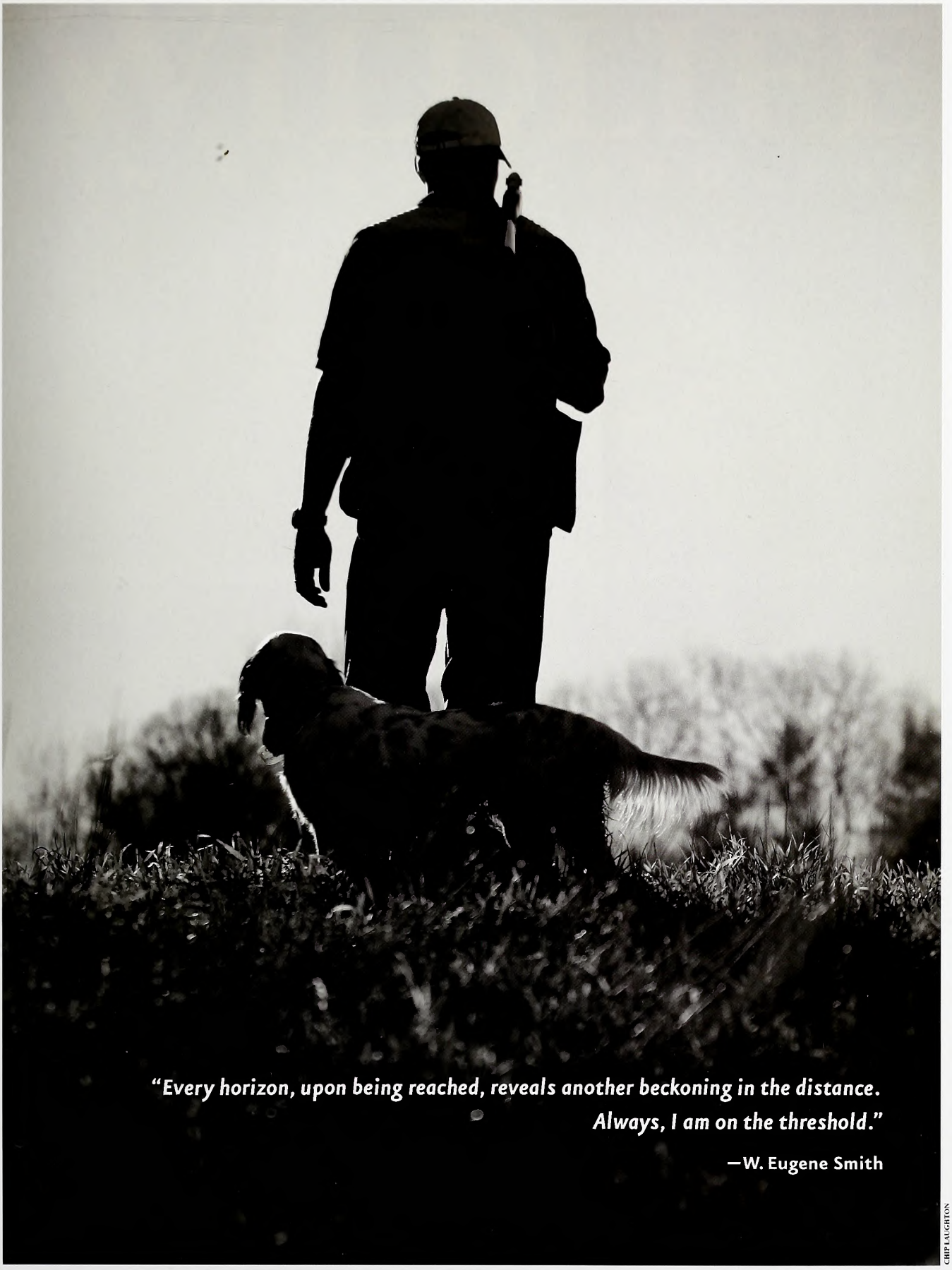
Which brings me to John Shelton Reed, Dale Volberg Reed and their new book "Holy Smoke," published by The UNC Press. The subtitle says this is "the definitive guide to the people, recipes and lore" of North Carolina barbecue, but that hardly seems adequate to describe this stunning achievement. It has clearly taken many years of loving research—and Heaven knows how many meals and loosened belts—to gather all of this material.

One interesting bit of lore the authors present is the origin of the term barbecue. In the 1500s, Spanish explorers found Indians in the Caribbean cooking on elevated frameworks of sticks that they called *barbacoa*, or at least that's what the Spanish thought it sounded like. As you would expect, there are recipes for barbecue and sauces, along with side dishes, desserts and sweet tea. The origins of both eastern- and western-style barbecue and slaw are explored with minimal prejudice. Your favorite barbecue joint is likely represented, along with photos, history, and interviews with those who pit-cook the hogs.

Readers long familiar with John's articles and columns in defense of the better elements of our Southern heritage already know that any subject he undertakes will be highly readable and humorous. However, he and Dale rightfully lament the decline in traditional wood-fired pits and the increase in cooking with gas or electricity. Even if our taste buds are not always sophisticated enough to detect the difference, aficionados of the true faith do not take kindly to change.

I recall how horrified I was a few years ago to see a BMW hauling a mobile pig-cooker through downtown Raleigh. "Oh Lordy," I thought. "The war is truly over, and we lost."

Yet, having read and enjoyed "Holy Smoke," I am encouraged to believe that there is no clear and imminent threat to our barbecue, which means that if we are ever convicted of some heinous crime, the sheriff won't have far to travel to pick up our last meal.



CHIP LAUGHTON

Hunter with English setter

OUTDOOR MOMENT

IN THE MAY ISSUE

NEW BERN-CRAVEN COUNTY PUBLIC LIBRARY

VISITORS TAKE THE FIELD

Babe Ruth is but one of many celebrities who have enjoyed hunting and fishing in our state.

AVOID RAMP RAGE

Check out these valuable common-sense tips for safely and courteously towing and launching your boat.

ABOVE THE BIRDS

To accurately survey heron breeding colonies, biologists must take to the clouds themselves.

FIND US ON THE WEB AT *www.ncwildlife.org*

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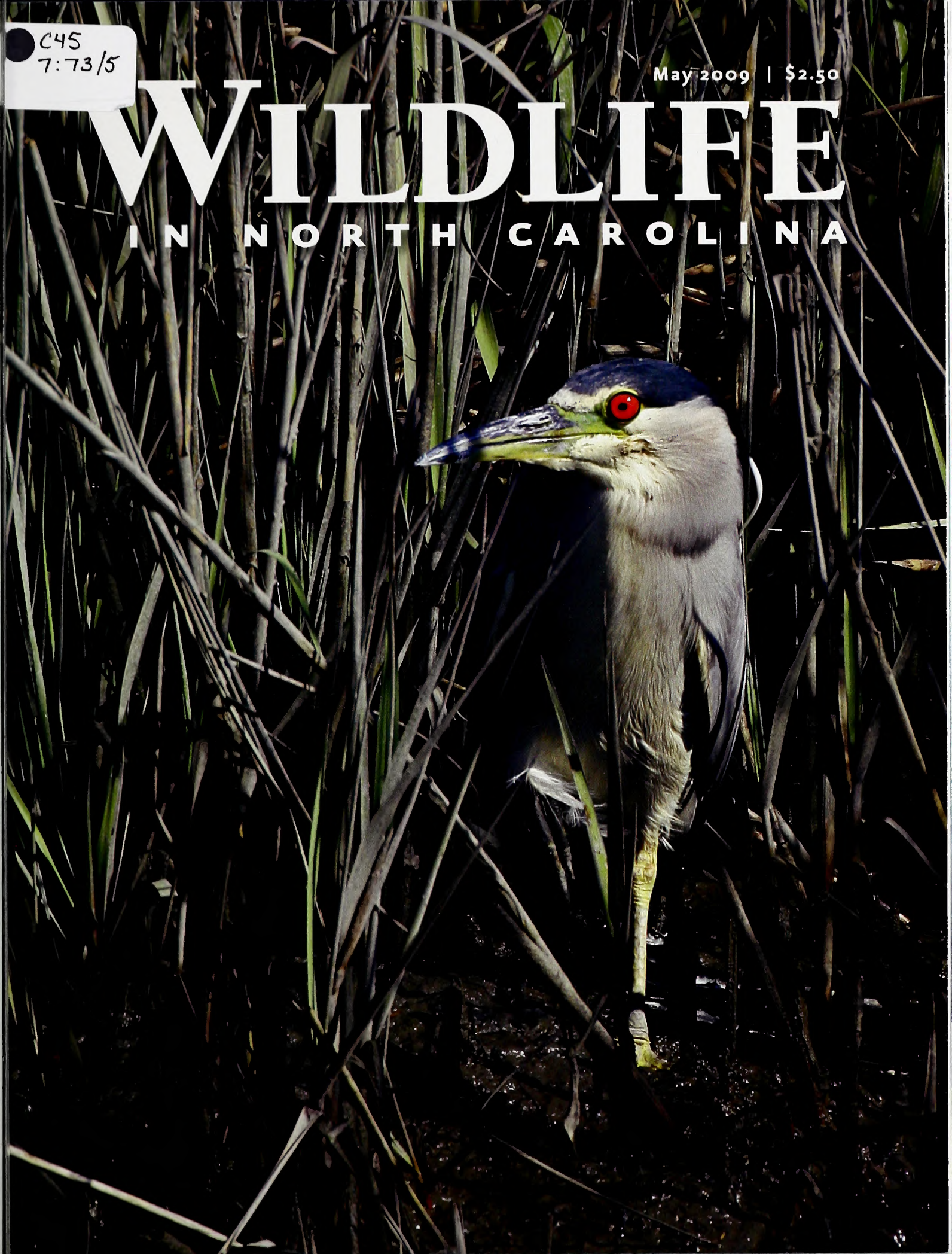
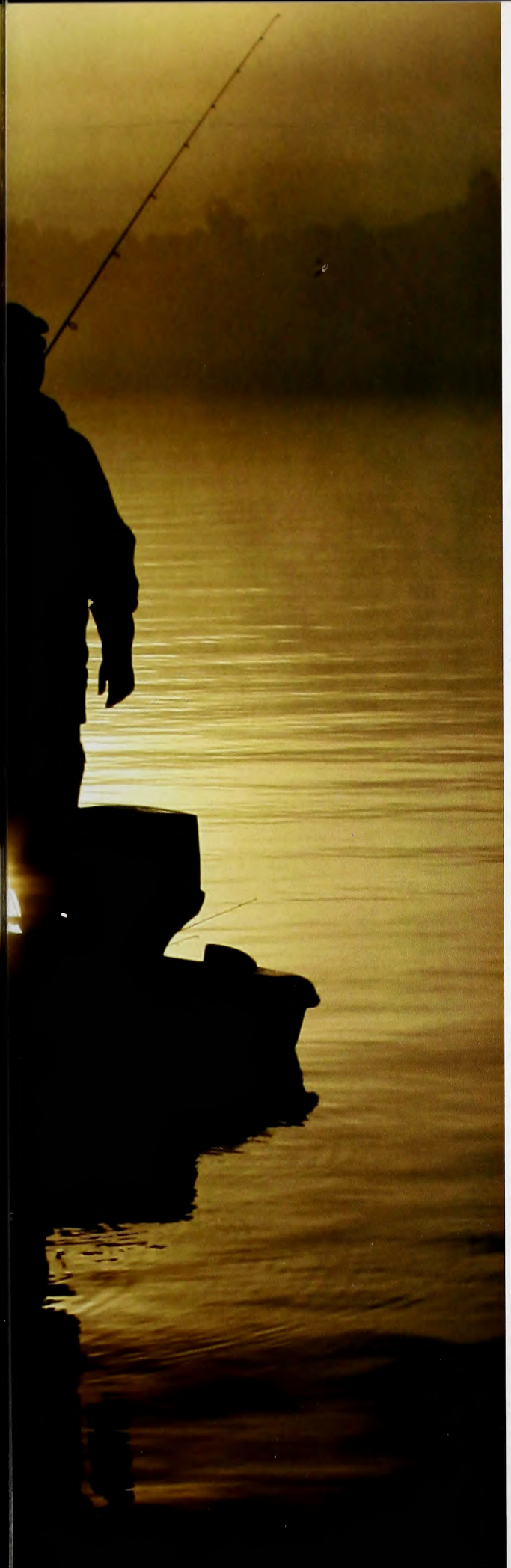
WILDLIFE IN NORTH CAROLINA



Following a few common-sense launching and docking tips can prevent fishing and boating trips from going wrong before you leave the boat ramp.

PHOTOGRAPH BY REGINA CHAYER.



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FEATURES

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written by Erica Newman
The best way to locate and document breeding colonies of wading birds is to take flight. Biologists with the N.C. Wildlife Resources Commission have done just that.

10 **ANGLING ADVENTURES ON THE YADKIN**
written by Bruce Ingram | photographed by Soc Clay
The section of the Yadkin River that runs through Pilot Mountain State Park might be one of the best places in the state to catch smallmouth and spotted bass.

16 **THE OUT-OF-TOWNERS**
written by Jay Barnes
For decades, a deluge of celebrities, politicians and sports stars have visited our state to take advantage of its wonderful sporting heritage.

20 **DOCKING DO'S AND DON'TS**
written by Mark Joyner | illustrated by Gary Palmer
Towing and launching a boat can cause all kinds of trouble before your vessel ever gets wet. Try these tips for maximum safety and courtesy at the boat ramp.

26 **SWIMMING WITH TIGERS**
written and photographed by Todd Pusser
Sand tiger sharks are some of the most ferocious-looking predators in the ocean. However, these large, toothy beasts pose no apparent threat to scuba divers.

DEPARTMENTS

2 **EDITOR'S NOTE**
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41 **OUTDOOR MOMENT**

Cover: The black-crowned night heron hunts alone but breeds and nests in large colonies known as rookeries or heronries. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

I have never seriously considered living somewhere other than North Carolina. I love to visit other places, but nowhere else is as broadly appealing as my home state. This issue contains several examples of that appeal.

SOC CLAY

River fishing for spotted bass is a blast.

For instance, the fishing trip mentioned in "Angling Adventures on the Yadkin" (page 10) was the latter part of a journey I took last year with frequent *WINC* contributor Bruce Ingram. After Bruce and I hunted turkeys for a couple of days, fishing guide Marty Shaffner took us out on the river in search of smallmouth bass and spotted bass. We drifted down the section of the river that flows through Pilot Mountain State Park, snagging smallies and spots in the riffles and pools. The fishing was good, but floating that gorgeous, wildlife-filled river was equally enjoyable.

North Carolina is rich with wonderful lakes, rivers, streams, sounds and ocean waters—most of them loaded with fish. And anyone who has spent any time in the outdoors knows that our state is a great place to hunt. That's why people have been coming from other places for decades to enjoy the bounty of wildlife available here. Jay Barnes describes in "The Out-of-Towners" (page 16) how famous folks of all descriptions have visited and even moved here over the years. Sports stars, film actors, politicians, captains of industry—people with the means to go anywhere love coming here.

If you enjoy viewing wildlife, North Carolina is the place for that as well. "Birds from Above" (page 4) tells of a scientific survey of herons and other wading birds, but it also illustrates just how many of these lovely creatures live in our state and can be watched in large groups during their mating season. "Swimming with Tigers" on page 26 takes us underwater to hang out with sand tiger sharks that forage around a shipwreck off the coast. The sharks look wicked but essentially ignore humans, providing an outstanding opportunity for scuba divers to see these top predators up close—and safely.

Our final feature story, "Docking Do's and Don'ts" (page 20) gives those who like to do their fishing, hunting, wildlife watching or relaxing on a boat some tips for safely and courteously towing and launching their vessel. In North Carolina, there is plenty of water and wildlife to go around. Let's all enjoy it together.

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

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Wordsmith

What a lovely writer is Shari Smith! I read "My Place is in the Kitchen" (March 2009) through a glaze of tears, picturing that girl child's aching envy of the men and their separate world. I was luckier, growing up in Texas where every man, woman and child was expected to know and respect firearms. Both my dad and mother loved guns, target-shot often, and taught me by the age of 12 to be a deadeye, shooting pennies out of the crotch of a tree with my own .22.

I would tell Shari Smith that it is never too late. She should hie herself off to the nearest gun club and commence! The learning of it all, the challenge of hitting the mark and the perfume of gunpowder are as satisfying as any plate piled high with feather-light biscuits! (My biscuits were like rocks.) She should join the NRA (I'm a life member), and they will aim her (no pun intended) in the right direction.

At 80, I recently hit a squirrel in the head with my gun and knocked him dead out of the top of a tree, much to the surprise of my old golden retriever. So, YOU GO, GIRL! It is never too late! And we hope to have many more stories by Shari Smith!

Patty Broderick
Mooresville

Dean's List

I always savor Jim Dean's articles, suitably placed as dessert at the end of each edition of *Wildlife in North Carolina*. I especially enjoyed February's "Down Time Reading," since all sportsmen love a good outdoor (or, in my case, fishing) story.

I would respectfully add two books to Mr. Dean's list. First is Izaak Walton's "The Compleat Angler." Initially printed in the 1600's, it has never gone out of print, has gone through 400 editions in 300 years, and is the third most published book in the English language (behind the Bible and Shakespeare). Although Izaak was, alas, often a bait fisherman and not devoted exclusively to trout, his book is a wonderful and timeless philosophical study of angling and the outdoor life in a modernizing world.

Over three hundred years later, in 1999, a young American artist and writer named James Prosek retraced Izaak's steps in a book named, suitably, "The Complete Angler." He revisited and successfully fished many of Izaak's old streams in England, some of which are now quite urbanized (e.g., London). His paintings stunningly illustrate his fascinating tales.

Jon Maxwell
Greensboro

Not finding it on Jim Dean's litany of suggested tomes for enduring winter ("Down-Time Reading"), I'd like to plug Joe Hutto's "Illumination in the Flatwoods: A Season with the Wild Turkey" to anyone remotely interested in the uncanny inter-workings of nature and/or the human-wildlife bond. Although written from Florida's pine woods (The Big Bend area), his descriptions of and insights into the wild turkeys he nurtured to adulthood from eggs should sufficiently enthrall outdoorsy North Carolinians.

In my opinion, Hutto's writing and content rivals the finest of John Muir ("The Water Ouzel"), Henry David Thoreau ("Walden") or William Henry Hudson ("Green Mansions"); he not only transcribes his experiences and observations but delves into the nature of (long-evolved) animal consciousness and creatures' innate understanding of their roles in the world. Sad, happy, lyrical and triumphant, it renders impossible the reader's ever again viewing turkeys through a preconceived or generic lens. Pit even against classic world literature, Hutto's prose sits among my top 10.

Rebecca Eagan
Winter Park, Fla.

Either Jim Dean or his editor owes Ernest Hemingway an apology for inserting a comma into the title of "The Short Happy Life of Francis Macomber" in his February 2009 column. It does about as much damage as a comma can do, entirely reversing the author's meaning. The point of the story is that the brief happy part of Macomber's miserable, henpecked life is the day or so between his discovery, on safari in Africa, that he's a man instead of a wimp and the moment his wife blows his head off.

Hank Burchard
Amherst, Va.

Just Plain Crabby

I have just finished reading two of the articles in the February issue — one about owls and the other about crabs. Is it really necessary to use all of those scientific words that nobody understands much less can pronounce? About the only thing still readable in the magazine is Jim Dean's column. This magazine is continuing to get worse under the current staff. It used to be very enjoyable reading but now it is full of strange articles that the average person has no interest in or understanding of. Go back to the good days of this once great publication and let's have some articles that real people can read and enjoy without having to break out a dictionary.

G. Hobbs
Address withheld

***Greg Jenkins:** In publishing stories about wild animals in North Carolina for 73 years, the magazine has encountered two main problems: different species with identical common names, and distinct species that look very much alike. Using scientific names is the only certain way to identify which species we are discussing. The magazine has always used scientific names and will continue this practice.*

write us

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MELISSA McGAW / NCWRC

BIRDS FROM ABOVE

TODD PUSSER

The best way to locate and document breeding colonies of wading birds

IS TO TAKE FLIGHT.

Biologists with the N.C. Wildlife Resources Commission have done just that,

WITH GOOD RESULTS.

Written by Erica Newman

You may have seen these graceful birds fishing at stream edges and lakesides with their spearlike beaks. Herons and egrets stand tall and poised, patient and motionless, waiting for a fish or a frog to swim by. Sometimes they fly up from a millpond, extending elegant wings and serpentine necks, croaking at whatever has disturbed their hunt.

Although they are solitary foragers, herons and egrets are highly social breeders. Groups of these birds nest near one another, sometimes two at a time, sometimes in groups of 50. On the Coastal Plain, they can nest together in colonies of 1,000 or more, often in combination with cormorants, wood storks, white ibises and anhingas. Wading bird colonies, also known as rookeries, are easily seen from a low-flying plane.

Colonial waterbirds such as great blue herons nest in groups of as many as 1,000 individuals or more.

The Coastal and Inland Heronry Survey Project began in the fall of 2007, when Sue Cameron called a meeting of N.C. Wildlife Resources Commission biologists to brainstorm about colonial wading birds. Equipped with copies of the 2006 Southeast U.S. Regional Waterbird Conservation Plan, we met with Cameron, the commission's coastal waterbirds biologist, and hashed out a plan to survey heron and egret colonies. This was to be the first survey of inland heronries, and an opportunity to update heronry inventories. The first part of this project was surveys by air, with ground surveys of new sites to follow.

The target species of this survey include great blue herons and great egrets, but we are also attempting to locate colonies of the smaller herons and egrets, such as snowy and cattle egrets, green herons, and black-crowned and yellow-crowned night herons, some of which are nocturnal and harder to find than the large, diurnal great blue herons and great egrets. The coastal group is looking for the tricolored heron and little blue heron, which nest later in the season. Some of these species are state listed as threatened or endangered. "This project will give us a chance to fill in critical gaps in our knowledge about the distribution of breeding herons and egrets and give us some indication of population trends," says Cameron, who is herself as willowy, tall and graceful as the birds she studies. She speaks with a combination of relaxed enthusiasm and technical expertise.

"Locating and monitoring coastal and inland heronries will allow the WRC and other agencies to prioritize land acquisition for conservation. Heronries have been surveyed regularly in coastal estuaries, but we lack complete surveys for inland heronries," Cameron says. And so, in accordance with its Wildlife Action Plan, the Wildlife Commission aimed to document heronries throughout the Coastal Plain and the Piedmont region over the course of three years.

The main threats to herons and egrets are habitat loss due to development pressures, and habitat fragmentation and degradation. The challenges of protecting these birds include buffering their roosting areas from disturbance and ensuring a clean environment for the health of the individuals. "Heronries are affected by disturbance," Cameron says, "and the birds themselves may be particularly vulnerable to aquatic pollution and habitat alteration as high-trophic-level predators."

Once we detect a heronry, we fly to the site and circle at higher altitudes until we have estimated active nest numbers and obtained a GPS data point to add to our database.

Biologists Kacy Cook (left, top photo) and Erica Newman watch for nests as pilot Martin Nordenstam gives them a bird's-eye view of rookeries in the North Carolina Piedmont. The biologists note each nesting site and record the GPS data points. Among the nesting birds counted in the survey were great egrets, a species found throughout the state.

TODD PUSSER

F. EUGENE HESTER

F. EUGENE HESTER

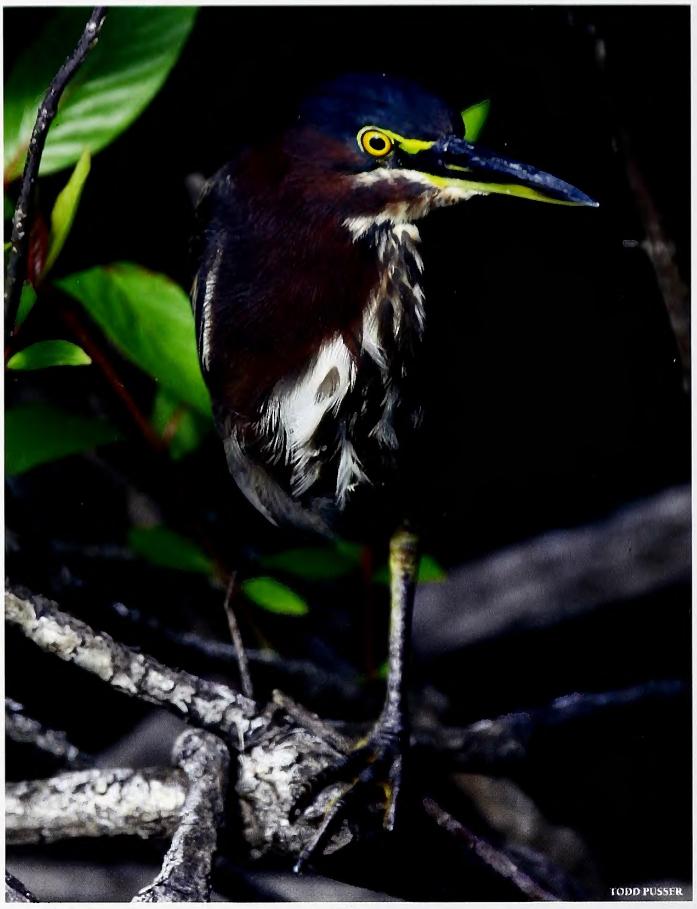
The surveys take place from late April to mid-May, peak nesting season for herons and egrets. Cameron's group is responsible for the Coastal Plain and spent the first year's survey effort in the Lumber River basin and part of the Cape Fear River basin. For the Piedmont survey, I was joined by Kacy Cook, the commission's Uwharrie Mountains land conservation biologist, and Hume Davenport, a pilot from the nonprofit group Southwings, which provides flight time, planes and pilots to biologists and conservationists conducting aerial surveys. Davenport has conducted many aerial surveys and was scheduled to work with both the Piedmont and the coastal groups. "I'm as thrilled as you guys are to see heronries for the first time," he says.

TAKEOFF

The first day of surveys is exciting, productive, sickening and new. Cook prepares a route for us to follow on the GPS unit, tracing out the major waterways of the Yadkin River basin. We can follow the route in real time and record which areas we have surveyed, as well as the locations of new heronries. Because we don't have experience doing aerial surveys, our initial plans lead us to make sharp turns for transecting routes. We are looking for round, gray nests in trees near or in water. The trees can be alive or dead, and the nests often appear above a wash of droppings that makes the foliage lighter and gives us a clue to bird activity.

Once we detect a heronry, we fly to the site and circle at higher altitudes until we have estimated active nest numbers and obtained a GPS data point to add to our database. All this data recording and bird watching occurs from a four-seater Cessna flying low to the ground and bumpily. "Let's see if we can defy gravity here," says Davenport, and we bounce higher into the sky for a better view. My stomach executes pirouettes.

While we are following waterways, we encounter unforeseen challenges. We fly through military-controlled airspace and are warned to keep an eye out for helicopters in training maneuvers. We do not see them but instead notice a red-tailed hawk flying beneath us. When I point animatedly, Davenport laughs and yells, "Fellow aviators!" into the headset. We get caught in three separate towers of vultures, and there is a lot of swerving on everyone's part to avoid a collision. I spend the rest of the afternoon a frosty shade



of green. I tell Davenport that a little fresh air might help me, and he responds, quite seriously, that we can take the doors off the plane if I would like. We manage to find seven active heronries before the day is, blissfully, over.

By day two, I have gotten the ratio of caffeine to Dramamine right (one cup of coffee to one motion-sickness pill) and take on the surveys with a stomach of steel. This is particularly important for working with our second pilot, Martin Nordenstam, who speaks and swaggers like a Swedish John Wayne. He flies brilliantly, if roguishly. We fly very low over the trees, much lower even than on the previous day, and slowly, with little chance to recover from a stall. But this is what the survey design calls for, and since we are finding an average of eight new heronries a day, we are pleased with detection rates. "I do what I can to help you ladies out," brags Nordenstam.

We fly over streams, ponds, rivers, wetlands, floodplains and lakes. We spend extra time at the lakes. "There!" Cook yells into the headset. Nordenstam makes the plane slide sideways out of the sky and circles us around a heronry on a lake island. Colonial wading birds prefer to nest on islands, where they are protected from predators such as raccoons and possums. They are also shielded to some extent from the development on the banks. Great blue herons, which are by far the most common wading bird species in the Piedmont, choose the tallest trees to nest in, whether they are pines or hardwoods, and nest high in the canopy. The birds will place up to five nests in each tree, or as many as will fit. Cook and I estimate as best we can at this speed whether we are seeing 35 nests or 45. I record habitat conditions and tree types, as well as which species are present, in a chaotic pencil scrawl on my clipboard as the plane rambles

Everyone needs a place to live and a place to work, but there are development practices that leave space for our wildlife, so it will always be there for us to enjoy.

and jolts along. We circle the colony in a tight corkscrew and add a GPS data point directly to our map while the stall warning squeals in the cramped cabin.

NATURE'S WAYS

How Do Herons Capture Prey?
See Nature's Ways, page 39.

TRADING PLACES

It is a role reversal, looking down on birds. In my work, I mostly watch songbirds, with binoculars upturned to the sky, or at the very least aimed above me to a nearby bird on a tree or shrub. It was surprising to me, as it must be to the herons, to have them looking up at us with something resembling curiosity. As we pass over a heron colony, I can see that the birds have their beaks cocked at a funny angle and are staring up at the plane. From a few hundred feet up, a heron's nest is the size of your thumbnail held at arm's length, and its white eggs are countable. The bird's expression, on the other hand, is inscrutable.

Nordenstam expertly navigates us through the anxiety-producing controlled airspaces near Charlotte and Winston-Salem. Sometimes we are trapped in what seem like knots in the time-space continuum, trying to get permission to survey a known heronry near a city, and then trying to get permission to leave, or to try to survey again. Sometimes we are denied or told to wait, and then we are off track. I negotiate with Nordenstam about which survey transect to pick up when we can get permission to leave. A 100-percent survey of each river basin will be impossible, and though we can estimate population numbers based on the proportion of areas we were able to survey compared to the areas we could not, we are still trying to be thorough. "My hands are tied here," Nordenstam says. "We don't want to turn into a fireball when one of those outbound planes hits us." No, of course not. I smile nervously. It's all for the herons, I tell myself.

When we land, Cook and I give interviews to reporters from newspapers in Montgomery and Stanly counties. They are concerned with changing land use and economic development in their counties. We tell them what we can about clear-cutting and development, and how what we are seeing in terms of development of subdivisions is destruction of the environment on a large scale. We take them up in the plane with us and show them heronries, which provoke amazed comments. They can also see how the landscape is changing, and at what scale. "At the rate and with the practices we are using to develop land, we need to consider wildlife conservation to prevent its extinction," says Cook. "Everyone needs a place to live and a place to work, but there are development practices that leave space for our wildlife, so it will always be there for us to enjoy."

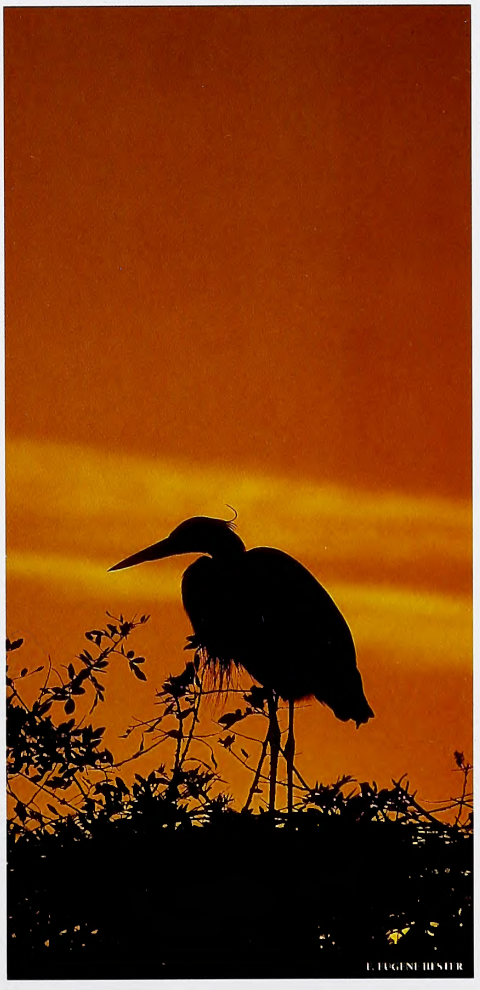
In a later conversation, Cook impresses upon me that what we learn can not only help local governments plan their land use in more ecologically sound ways but can also be used by private landowners to plan around the wildlife habitat on their property. As more of a "deep ecologist," I believe that the herons should be protected for their own sake and not just for our enjoyment, because when economic pressures are applied, we may not be so keen to protect birds as we are to make money from land. "It's true," says Cook, "but with herons, we have long-term, enduring economic benefits from protecting them and their habitat, like clean water, clean air and open space."

Our surveys continue for about two weeks. We find 35 new heronries and a number of single nests that we will check for more activity in future years. Some of the nesting sites surprise us, such as the 120-nest heronry right next to the Lowe's Motor Speedway near Charlotte. We also fail to find a few known heronries and cannot yet tell if they have relocated or simply blinked out of existence. With the scope and thoroughness of this project, though, we may be able to tell if the overall populations of colonial waterbirds are holding up. Cook and I feel good about finding the new heronries. I feel nervous about the others.

As we land and taxi down the runway, a great blue heron flies above us with its steady, rubbery wing beats and feet trailing behind its body. It is a beautiful bird, large and serene, blue and gray, both subtle and striking. After seeing hundreds of birds from above, the sight of one more flying over us still makes my heart leap with joy. I look up and pause to appreciate a bird reclaiming its rightful relationship in the skies above us. ◆

Erica Newman, a former Wildlife Commission employee, is a research associate at the Center for Fire Research and Outreach at the University of California, Berkeley.

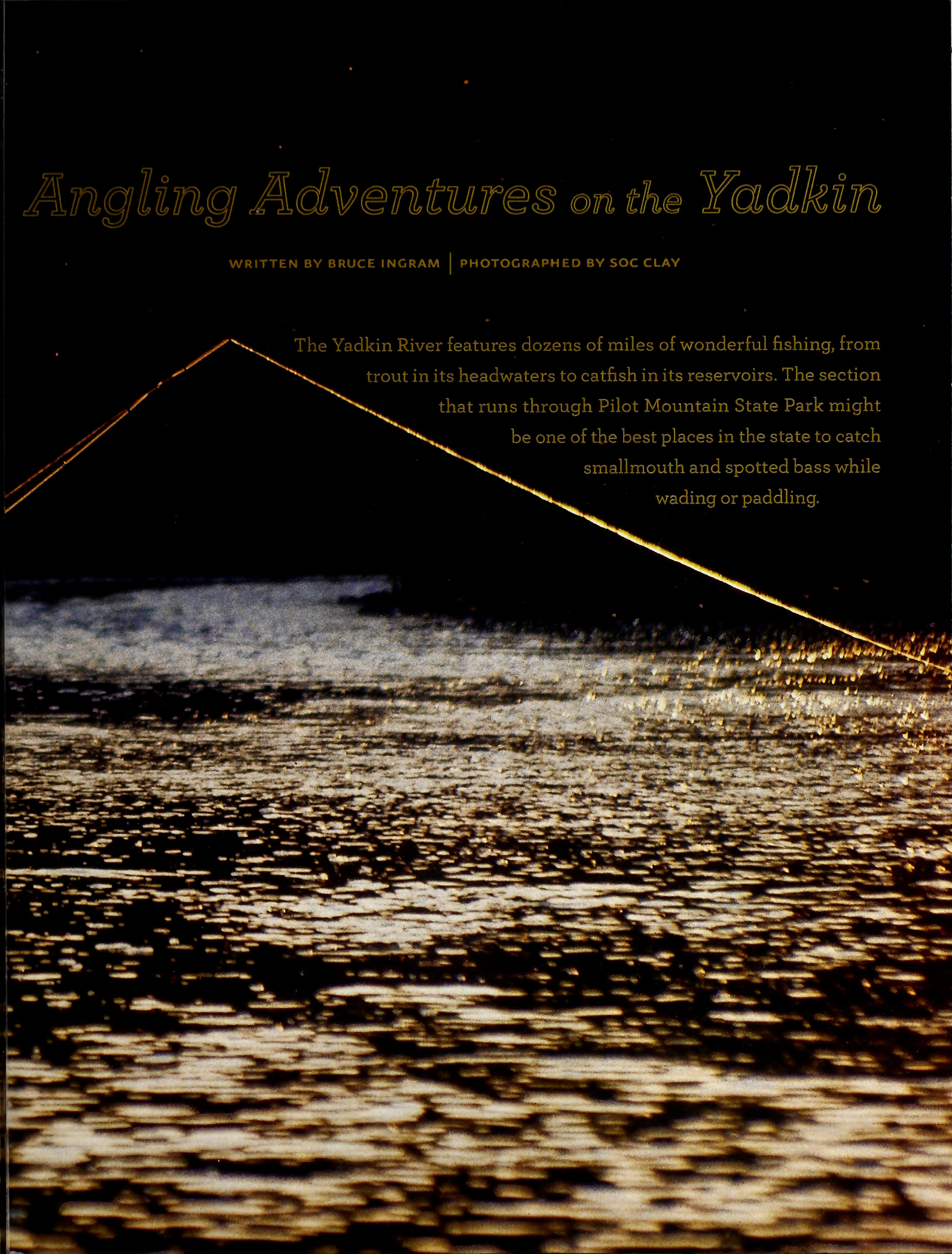
Although birds such as green herons (counterclockwise from top left), little blue herons, great blue herons and yellow-crowned night herons are solitary hunters, they all nest in groups.



Angling Adventures on the Yadkin

WRITTEN BY BRUCE INGRAM | PHOTOGRAPHED BY SOC CLAY

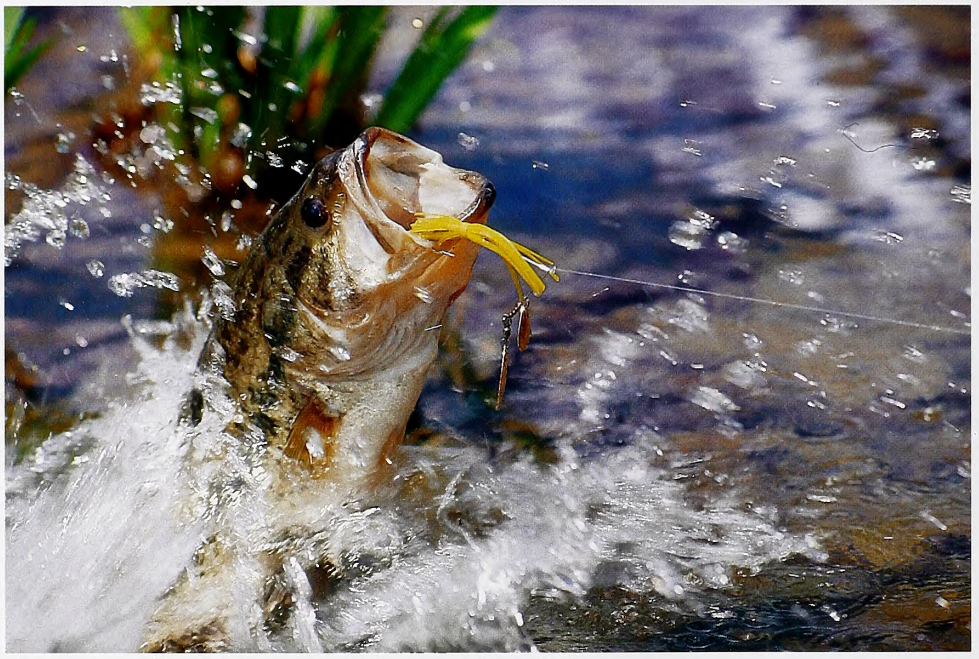
The Yadkin River features dozens of miles of wonderful fishing, from trout in its headwaters to catfish in its reservoirs. The section that runs through Pilot Mountain State Park might be one of the best places in the state to catch smallmouth and spotted bass while wading or paddling.



Look at him, he's hovering . . . he's diving . . . he's caught a sucker," exulted fishing guide Marty Shaffner. His enthusiasm was understandable. *Wildlife in North Carolina* editor Greg Jenkins and I were likewise mesmerized by the aerial acrobatics, grace and brute power of an osprey.

That scene took place in April 2008 as the three of us were float-fishing for smallmouth and spotted bass on the Yadkin River as it flows through Pilot Mountain State Park in Surry County. Actually, the osprey and our trio were not the only ones engaged in some serious forms of fishing. At the park, we saw two boys trying to corral crayfish by building a dam along Horne Creek, a tributary of the river.

Along the shore of the Yadkin as it flows through the park, we observed several pairs of parents and their offspring casting from the bank, hoping to tangle with sunfish and catfish. The Yadkin River is truly one of those waterways that can provide a variety of fishing and outdoor experiences.



A good fishing guide can be very helpful, but a small boat is all that is necessary to drift the Yadkin River for spotted bass (above) caught on a spinnerbait.

BRUCE INGRAM

Like many North Carolina streams, the Yadkin River's headwaters pour forth from scores of western springs, from those at an elevation of 3,600 feet near Blowing Rock to mountain rills in eastern Alleghany County, that coalesce to form the Mitchell River, a major tributary. But most North Carolina outdoor enthusiasts know the Yadkin as a Piedmont stream, one that features gently flowing water and the odd riffle/shoal area.

A section that anglers might want to know better (especially if they are looking for a place to vacation at a state park) is that part of the Yadkin that flows through and near Pilot Mountain State Park. Kevin Hining, District 7 fisheries biologist for the N.C. Wildlife Resources Commission, raves about this part of the stream.

"The Pilot Mountain State Park section of the Yadkin River would be a great wade-fishing trip," Hining told me. "There are some nice fish in this portion of the river—including smallmouth bass in excess of 20 inches long. This would be a good section to canoe, but you would need to paddle [from the park's launch] all the way down to the Donnoha Access, which is about 6.5 miles on Highway 67, just east of East Bend.

"To be honest, you could spend days just wade-fishing the state park access section. It's literally ¼ mile wide and full of ledges, boulders and islands. It's a neat spot."

Hining suggests that sportsmen wanting to know more go to the Pilot Mountain State Park Web site. The site features a map and lists directions to the park. To reach the river, be sure to follow the directions for the south portion of the park.

Fishing Overview

"The Yadkin River supports a wide diversity of fish species, from wild trout in its headwaters to spotted bass, smallmouth bass, flathead catfish and even gar further downstream near High Rock Lake," continued Hining. "A total of 16 game fish and five catfish species were observed during a survey in 2005 by the Wildlife Commission."

To better understand the waterway, it's probably best to break it into three sections, said the biologist: 1) headwaters (Caldwell and Wilkes counties) to W. Kerr Scott Reservoir (Wilkes County); 2) W. Kerr Scott Reservoir to Idols Dam near Winston-Salem (Forsyth County); and 3) Idols Dam to High Rock Lake (Davidson County).

Headwaters to W. Kerr Scott Reservoir

From the Blowing Rock area along Highway 321 through the Blue Ridge Mountains into the foothills, the Yadkin and its tributaries host wild brook, brown and rainbow trout.

"As the river grows in size and drops down from the mountains into the foothills, it warms and widens into habitat more favorable to smallmouth bass, spotted bass, largemouth bass and sunfish, primarily redbreast sunfish," says Hining.

Access is limited to a few bridge crossings and a couple of small parks, primarily along N.C. 268. However, the river is canoeable during normal flows for most of the section along N.C. 268 to W. Kerr Scott Reservoir.

"The Wildlife Commission has a fair amount of data on the trout populations in the upper Yadkin River but has limited data on the warmer-water fishery composed primarily of bass and sunfish upstream of W. Kerr Scott Reservoir," said Hining. "Also worth mentioning, there are several large tributaries to the Yadkin near the Caldwell and Wilkes county line, including Buffalo Creek, Elk Creek and Stony Fork. All three of these streams hold smallmouth bass in the lower reaches and wild trout in the headwaters. Furthermore, portions of all three of these streams are stocked with catchable trout by the Wildlife Commission and managed under Hatchery Supported regulations."

W. Kerr Scott Reservoir to Idols Dam

The Wildlife Commission sampled this stretch of the Yadkin in 2001 and 2005. "The dominant sport fish in this portion of the river include spotted bass, smallmouth bass, redbreast sunfish and bullhead catfish," Hining said. "Spotted bass were found throughout this portion of the river and were found in a wide variety of habitats—along the banks, around woody structure and in more swift rocky areas, typically where smallmouth bass are found. While the majority of spotted bass collected during our samples were in the 8- to 12-inch range, there were a good number of fish in the 14- to 16-inch range."

I have taken several trips in this section with Shaffner, who operates Tri-State Angler Guide Service out of Wilkes County. On our excursions, Marty and I have caught smallmouths up to 18 inches long, and I have lost several bronzebacks that pushed 20 inches. On our state park trip, Shaffner, Jenkins and

I all caught smallies that topped 15 inches, and Marty landed a spot that ran 13 inches.

As veteran river runners would expect, and as Hining confirms, the smallmouth bass are found primarily near shoals, rock-laden riffles and Class I rapids. In some reaches of the river these habitat types may be separated from each other for a mile or more by slower, sandy-bottomed stretches. The fishing for spots can be very good in the pools and along wooded banks, and smallmouth fishing near areas with lots of swift currents, ledges and rocky substrate can be exceptional.

"While there are others areas on the Yadkin that harbor good smallmouth bass, the sections near the small communities of Rockford and Shoals are very good," emphasizes Hining. "The latter section is actually within Pilot Mountain State Park. Many folks who see the Yadkin River from a bridge or roadside may assume the river is fairly slow-flowing, with little in-stream habitat.

"However, the portion of the river within Pilot Mountain State Park is much closer to the New, Little Tennessee and Nolichucky rivers in character. This spot, as well as the area around Rockford, provides great wading opportunities for anglers."

On my junkets with Shaffner, we have done extremely well fishing hard plastic jerkbaits such as the Rapala Original Minnow and Bomber Long A's. On our most recent trip, for instance, all of the quality smallies fell for jerkbaits. Soft plastic jerkbaits have also performed well, especially for spotted

BRUCE INGRAM

At Pilot Mountain State Park, it is easy to combine camping with river fishing. Just make sure to follow park regulations for reservations, fees and fires.

Whether you are floating or wading in the Yadkin River, topwater plugs can yield a nice catch of smallmouth bass.

bass. Hining recommends soft plastic lizard imitations with small sliding bullet sinkers.

Shaffner adds that another virtue of the Piedmont section of the Yadkin is a lack of angling pressure. "Lake fishing is more popular in this part of the state, so I don't see many people on the Yadkin," he says. "I also must say that the river fishes a lot better now than when I was growing up. A big attraction is the spotted bass, some of which run up to 16 inches, which is huge for a North Carolina river spot."

The biologist emphasizes that wade fishermen in the Rockford and Shoals areas should wear life jackets and waders with nonslip boots. Both sections have ledges and holes in excess of 6 feet deep, deceptively strong currents, and lots of rocks. Also, the Yadkin River, like most major waterways in North Carolina, is subject to lots of sedimentation from agriculture, logging and development, making visibility poor for wade fishermen. The river can become quite muddy at times and may take several days to clear.

Doug Holyfield, who along with his wife operates the Rockford Inn near Pilot Mountain State Park, adds that many local folks like to canoe or tube from the Rockford Bridge to the park. The bird watching on this section is outstanding. On our April junket, I noted ovenbirds, wood thrushes, hooded warblers and yellow-throated vireos, just to name a few.

Interestingly, Hining lists an underpublicized fish species as the major one in terms of numbers. "By far, the dominant sport fish in this reach is the bullhead catfish," he said. "While bullheads are often overlooked due to their small size (rarely exceeding 14 inches in our samples), they are fairly easy to catch (a few hooks, sinkers and night crawlers or red worms will often do the trick), and they make great table fare.

"Our catch rates (number of fish captured per hour with electrofishing gear) usually ranged from 10 to 50 fish an hour for the majority of sport fish in the Yadkin, but bullheads exceeded 100 fish an hour at all sample sites between W. Kerr Scott Reservoir and Idols Dam and even exceeded 180 fish an hour in a couple of locations."

Also of note is that I foul-hooked a sucker while floating the river. Hining confirms that redhorse suckers are found throughout this section. During Wildlife Commission sampling, suckers outnumbered all other fish by far, and most exceeded 15 inches long. Except for a small group of anglers, most folks do not target suckers.

"However, suckers can be a lot of fun to catch and, depending on whom you ask, are good to eat," relates Hining. "It was relatively recently that smallmouth and spotted bass, flathead catfish and many of the other species people usually associate with fishing were introduced to the Yadkin River. However, suckers have inhabited the Yadkin River since before Europeans set foot on the continent and probably provided the river's early inhabitants with a valuable food source.

"So if you've often wondered what fishing was like 200 or even 100 years ago on the Yadkin River, as well as on many other Piedmont rivers, then give suckers a try. Though I have limited experience fishing for them, I have had success on the Yadkin using a small number 6 or 8 hook with a piece of red worm and a split shot or two. In my experience the bites are often light, but the fish really put up a fight once hooked. They can be a lot of fun to catch on light tackle, and I've been broken off on more than one occasion."

Finally, for this section of the Yadkin, Hining relates that redbreast and bluegill sunfish can be found throughout, and several large tributaries (Reddies, Roaring, Mitchell and Fisher rivers, to name just a few) generally offer smallmouth bass and

redbreast sunfish. Many of these streams also are stocked with catchable trout and managed under Hatchery Supported or Delayed Harvest trout fishing regulations by the Wildlife Commission. Hining suggests checking out the trout maps on the commission Web site for more detailed trout fishing information: www.ncwildlife.org.

Idols Dam to High Rock Lake

From Idols Dam to High Rock Lake, the Yadkin's fishery dramatically changes.

"Downstream of Idols Dam, spotted bass are still present, but we did not encounter smallmouth bass," Hining said. "Furthermore, bullhead catfish were not found below the dam, even though catch rates were extremely high above the dam. This portion of the river holds a good population of flathead catfish.

"Flathead catfish grow quite large, often exceeding 40 pounds and occasionally exceeding 75 pounds, in North Carolina. Bullhead catfish are a favored food for large flatheads, and this probably accounts for the lack of bullheads below the dam. We also encountered good numbers of channel catfish below the dam, a species we found very few of above the dam; and bluegill sunfish were also quite common.

"In addition, longnose gar were frequently encountered below the dam. Anglers also fish for striped bass and white bass in this portion of the river during the spring when these fish species swim upstream from High Rock Lake in an attempt to spawn."

Access The Yadkin River Trail, which is the longest North Carolina trail with developed access sites, covers the stream for 161 miles, from W. Scott Kerr Reservoir to the Pee Dee River. Between W. Scott Reservoir and High Rock Lake, there are 126 miles of floatable river (although there are two small dams that require portaging) and 14 access points.

A few of these sites include boat ramps, and many provide wade-fishing. A list of public access sites for North Carolina rivers and lakes is available on the fishing portion of the commission's Web site. ◆

Bruce Ingram is the author of four books on river fishing and floating, among them "Fly and Spin Fishing for River Smallmouths." For more information, contact him at be_ingram@juno.com.

IF YOU GO Pilot Mountain State Park and More

Yadkin float fishermen may find it convenient to camp at Pilot Mountain State Park. Superintendent Matt Windsor said that the park is very much a part of the Yadkin River Valley and the northwest Piedmont.

"It seems like just about everyone that grows up in this area visits the park at one time or another," said Windsor. "Fishing is not the only outdoor attraction. We have about 20 miles of trails; Mountain, Piedmont and riparian vegetation; and a real diversity of songbirds. And though the campground is usually busy, it's not so filled that someone can't drop by and usually find a place to stay." On the park's Web site, you can find out what kinds of birds nest there and which are seasonal visitors.

Ranger Keith Martin said that the park, with assistance from the Wildlife Commission, offers an annual Kids Fishing Derby, typically in June. Special volunteers stock Horne Creek with bluegills and bass, and channel catfish are stocked by the commission. Martin says the event is a marvelous way to introduce children to fishing. Free gear and various awards and door prizes are part of the derby as well.

Adjacent to Pilot Mountain is the Horne Creek Living Historical Farm. Hundreds of varieties of Southern vintage apples are grown there. Visitors can check out an original farmhouse, a tobacco curing barn and a corncrib. Historical interpreter Rick Jessup said that a popular annual event is the Corn Shucking Frolic in October.

And if you're a fan of bed-and-breakfasts, consider the Rockford Inn, located on the Yadkin in the village of Rockford a few miles west of the park. Be sure to ask for the baked egg and cheese dish for breakfast, although the sweet potato pancakes are tempting as well.

—Bruce Ingram

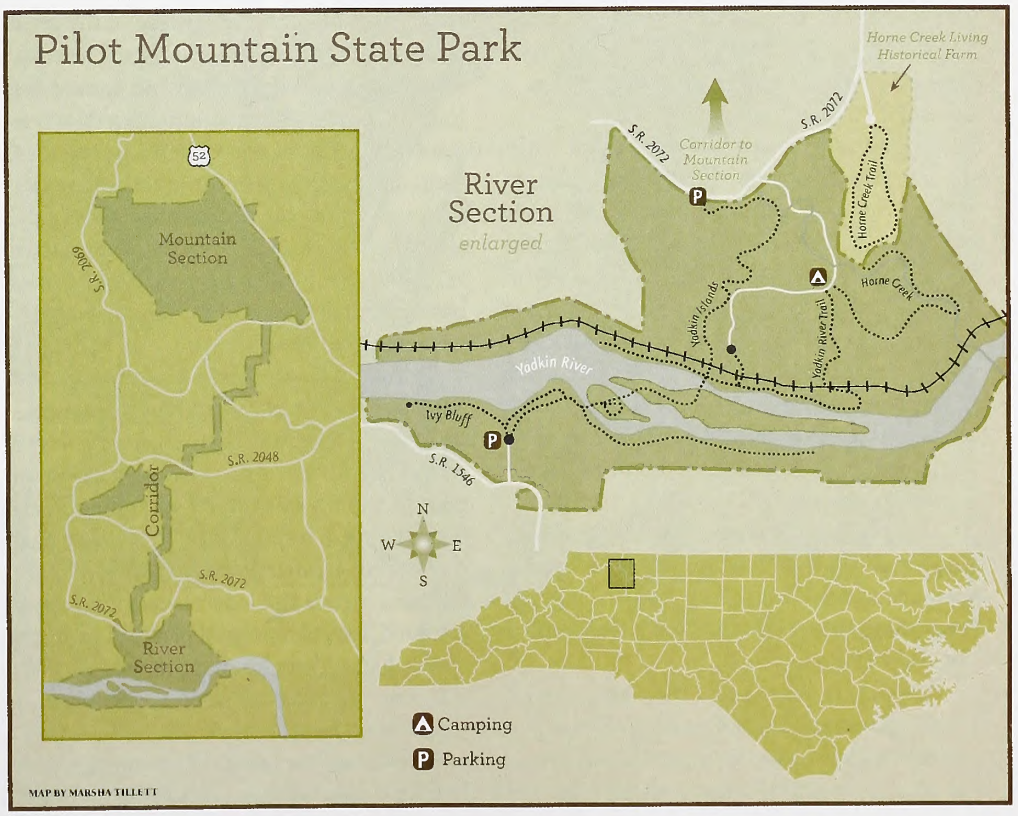
Pilot Mountain State Park
www.ncsparks.net/pimo.html
(336) 325-2355

Mount Airy Visitors Center
www.visitmayberry.com
1-800-948-0949 or (336) 786-6116

Tri-State Angler Guide Service
www.tristateangler.com
(336) 957- 4630 or (336) 902-0044

The Rockford Inn
www.rockfordbedandbreakfast.com
1-800-561-6652 or (336) 374-6644

Horne Creek Living Historical Farm
www.ah.dcr.state.nc.us/sections/hs/horne/horne.htm
(336) 325-2298



The Out-of-Towners

North Carolina's sporting treasures are some of the worst-kept secrets in the country. For decades, a deluge of celebrities, politicians and sports stars have visited our state to take advantage of its wonderful sporting heritage.

Written by Jay Barnes

On Oct. 22, 2001, the fishing was pretty lousy for three men on a 21-foot SeaCraft who plied the waters near Cape Lookout. After a morning of casting with hardly a bite, they headed back in, patiently navigating the rolling swells that crossed Beaufort Inlet. George Herbert Walker Bush, 41st President of the United States, was on the bow. "Let's go over to the Coast Guard station and say hello to those boys," the president casually suggested.

Followed by a second boat loaded with Secret Service agents, the SeaCraft made a wide left turn just inside the inlet and slowly approached the docking basin at Coast Guard Base Fort Macon. As the men idled into the harbor toward a large white cutter moored at the dock, a young Coastie leaned over the ship's rail and shouted down to the men: "Hey, you can't come in here!" From the bow, Bush replied: "Son, I'm the former commander in chief. Don't you think you could let me come in?"

After a few quick gasps of disbelief, the cutter's crew scrambled to greet the former president and welcome him aboard. He didn't stay long. He just shook their hands and briefly walked the deck.

It's not surprising that the Coast Guard knew nothing of his arrival. President Bush's many fishing trips to Carteret County were always quiet affairs, affording him the opportunity to do what most fishermen really want to do: Just relax.

Rubbing Elbows

For more than a century, nationally known politicians, sports figures and celebrities have traveled to North Carolina to explore its rich wilderness and take advantage of the great hunting and fishing it has to offer. The state's vast resources of land, fish and game have long been revered by serious sportsmen as some of the very best anywhere. Among these sportsmen are the wealthy and the famous. Through the years, scores of professional athletes, Hollywood stars, recording artists, U.S. presidents and other household names have spent countless hours hunting and fishing across the Tar Heel State.

For most, the trips here are unpublicized adventures. A few arrive with great fanfare, turning out large, welcoming crowds of local admirers. But celebrities usually prefer to slip quietly into the still forests and quiet waters that offer them respite. Most often, their expeditions are arranged and hosted by North Carolina friends and led by local guides. Some are lured here by reports of plentiful game and sizable fish. Others just happen to be in North Carolina and seize the opportunity to enjoy the state's great outdoors.

Their names are as diverse as the game and fish they come to quarry. Babe Ruth, Annie Oakley, Franklin D. Roosevelt, Paul Newman, Curtis Strange and Kim Basinger are but a few of the many nationally known folk who have spent time here with rod or gun. In all, it is an eclectic assortment of men and women who have visited our state and no doubt cherished their days spent here.

An Eye for the Area

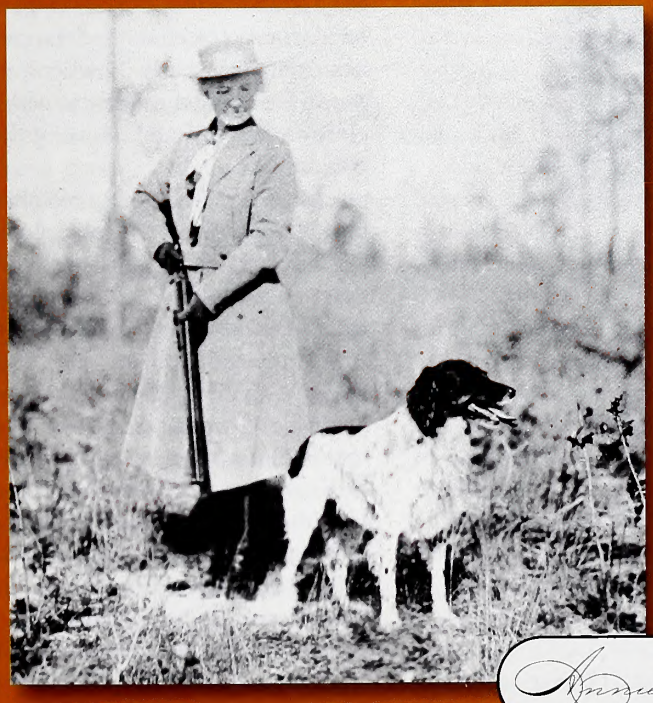
Through the late 19th century, long before the days of cinema, Annie Oakley was a superstar performer known around the globe. She applied her magic with six-shooters, shotguns and rifles, first winning marksmanship contests and ultimately starring in Buffalo Bill's Traveling Wild West Show, with which she toured the United States and Europe for 17 years.

After a disastrous train wreck in 1901 killed more than 100 of the show's horses and severely injured Annie, her touring ended. But she never lost her shot, and in 1915, at age 55, she was hired by the prestigious Carolina Hotel in Pinehurst to entertain the resort's steady legion of guests. For years, she and her husband, Frank Butler, lived at the hotel, where they taught marksmanship and performed regularly with their dog, Dave.

While in Pinehurst, Annie treasured her time spent in nearby forests and on local farms. She and Frank regularly hunted turkeys, quail and pheasants, and she wrote

Babe Ruth

PHOTOS COURTESY OF NEW BERN-CRAVEN COUNTY PUBLIC LIBRARY



Annie Oakley

PHOTOS COURTESY OF TUPPS ARCHIVE

Frank Stevens (top left photo, to the right of Babe Ruth), the major league ballpark "Concession King," first introduced Ruth to hunting in eastern North Carolina. Ruth sometimes brought along his wife, Claire (top right image), who also enjoyed hunting. Annie Oakley (above, left) worked for the Carolina Hotel in Pinehurst and hunted foxes, quail and pheasants with her husband, Frank Butler (above right).

FRANKLIN D. ROOSEVELT LIBRARY

MORRIS MARINA

MICHAEL HELMINSKI

① *Franklin Roosevelt*

Franklin D. Roosevelt, through the invitation of an acquaintance, made several hunting trips to Carteret County starting in 1915.

② *Ted Williams*

Baseball legend Ted Williams is shown here proudly displaying a catch of red drum caught on Core Banks.

③ *George Bush*

Former President Bush is shown here with his "first fish" that he caught on a trip to pursue false albacore at Cape Lookout in 1997.

of the joys of "wearing long pants and leading fox hunts." She also opened a shooting school for girls and claimed to have taught more than 15,000 young women how to handle guns and shoot targets.

The Bambino

Down in Craven County, it was the storied hunting and fishing around Camp Bryan that lured scores of Northern ballplayers and businessmen in the early 20th century. Camp Bryan is among the oldest private hunt clubs in the state and in one of the state's wildest places.

One of the club's early members was Boston native George Nicoll, who invited his Northern friends for weeklong hunts. Among them was Frank Stevens, the "Concession King" at major-league ballparks (Frank's father "invented" the hot dog). Stevens fell in love with the mild weather and excellent hunting, and for four decades he made annual trips to Camp Bryan, bringing with him many of the great names in baseball.

Although many famous players came, including Lou Gehrig and Ted Williams, a regular to the area was the immortal Babe Ruth. He made a habit of hunting in Craven, Carteret and Pamlico counties in the late 1920s and early 1930s.

His first stay in the area featured a quail hunt near the camp, where Ruth reportedly downed five birds in five shots. Later the men went by boat to Portsmouth, where they met local guides and hunted waterfowl. When

Ruth boarded the train for New York four days later, he carried an oversized bag of game, including a selection of geese, ducks, rabbits, turkeys and quail.

"Tell the people I love North Carolina," he told a New Bern reporter. "The hospitality has been wonderful, and the fellows here are great. The hunting possibilities are unlimited, and the climate is fine. I've had lots of fun and will be back next year."

Unfortunately, Ruth's first attempts to shoot a Carolina deer weren't as successful. It wasn't until his fourth visit to Camp Bryan, in December 1930, that he killed his first buck. According to the *New Bernian*, "He was so proud of his quarry that he has obtained a permit to take it back to New York on the train, as proof for his friends."

The Best and Brightest

During this time, hunt clubs were thriving in eastern Carteret County. One prominent lodge was the Pilentary Hunting Club, built near Portsmouth by industrialist Jordan Mott. Mott's family traveled throughout the United States and Europe, rubbing elbows with Roosevelts, Vanderbilts, Rockefellers and other high society.

Franklin D. Roosevelt joined Mott for a hunt in December 1915, while Roosevelt was assistant secretary of the Navy. They enjoyed several days of shooting at the club, then ventured north to hunt through Albemarle Sound and into Virginia. Roosevelt made several other sporting trips to North Carolina, including a visit to Moore County to hunt quail with his Harvard classmate Roger Derby. It was years later, after he became president in 1933, that Roosevelt established the Migratory Bird Hunting and Conservation Stamp, which became known as the Duck Stamp.

Through the late 19th and early 20th centuries, dozens of hunt clubs rimmed the marshy shores of Currituck Sound in the northeast. They too hosted well-known tycoons, ballplayers and politicians. Among the famous who hunted these clubs were U.S. presidents Grover Cleveland and Benjamin Harrison, Eastman Kodak founder George Eastman, editors of major newspapers in New York and Washington, D.C., and another baseball legend turned sportsman, Ty Cobb.

Jack Dempsey, world heavyweight boxing champion from 1919 to 1926, had been an avid hunter since his early days as a trapper in Colorado. After retiring from boxing, he tried many kinds of hunting around the United States and Canada. Dempsey visited several Currituck clubs over the years and hunted with Ray Adams at his Whalehead Club in Corolla during the 1940s.

The Tradition Continues

In contrast to earlier days when salaries were low, sports heroes were few and politicians were revered, today's celebrity-rich society abounds with nationally known personalities who have money and time to spend on leisure. And like the rest of us, a few choose to spend it hunting and fishing.

In recent years, charter boat captains from the Outer Banks to Wilmington have reported offshore runs with the likes of Bruce Willis (Oregon Inlet), Alec Baldwin and Kim Basinger (Wrightsville Beach), Paul Newman (Harkers Island), and Stedman—Oprah's boyfriend (Wrightsville Beach). Former NFL players such as Art Monk of the Washington Redskins and Tim Irwin of the Minnesota Vikings have fished here, along with other notables from the NBA, NHL, NASCAR and professional wrestling.

The NASCAR boys are particularly passionate fishermen, especially those who either were born in North Carolina or now live here. Junior Johnson, Jeff Burton and Terry Labonte have all fished with charter captains along the coast. Capt. Rom Whitaker remembers the day Labonte caught a 15-pound bluefish while fishing out of Hatteras aboard the *Release*.

The 2008 Daytona 500 winner, Ryan Newman, prefers bass fishing and often spends his quiet time fishing the 7-acre pond at his home in Statesville. In 2006, Newman launched his own celebrity bass tournament through his Ryan Newman Foundation to benefit local spay-and-neuter clinics and wildlife conservation efforts. Tony Stewart, Kyle Petty and Martin Truex Jr. are just a few of his fellow drivers who turn out for the event.

Pro golfer and two-time U.S. Open winner Curtis Strange grew up hunting and fishing in Virginia but moved to Morehead City in 2004. He fishes three or four tournaments a year aboard his "pride and joy," a 53-foot Jarrett Bay named *Lady Sarah*. He also spends time hunting in a Carteret County club with his youngest son, whom he says "would rather hunt than eat."

Strange did a lot of bass fishing growing up but now prefers being offshore. "The fishing is as good here as anywhere in the world," he says. "The variety and quantity of the catch, the weather—it's all fantastic."

Many well-known native Tar Heels, past and present, have also hunted or fished around the state. Dale Earnhardt, Charlie Daniels, Hugh Morton, "Catfish" Hunter and Gaylord Perry are just a few.

A Needed Break

Beaufort resident Sam Sellars met George H. W. Bush for the first time in 1996, when their paths crossed at a Republican fundraiser in Raleigh. After a brief introduction, the president cut right to the chase. "Sam, do you like to hunt and fish?" Bush inquired. "Heck yeah, I love to!" was his reply.

From there the two hit it off, with Sellars telling the president about the great false albacore fishing down at Cape Lookout. They exchanged business cards, and about two weeks later Sellars' cell phone rang as he drove on the interstate. It was the president, calling to follow up on the albacore. "About that time, my cell phone cut out, and I thought, *Man, I just cut off the president,*" Sellars recalls. "He phoned back soon afterward and asked if I'd paid my phone bill."

Bush eventually joined Sellars in Beaufort on Halloween 1997, fished through the afternoon, enjoyed a fine dinner at the home of a friend, and then flew out late that evening for Florida. On later trips, he stayed longer and caught more fish. One year, he reeled in so many 12- to 14-pounders that his wrists began to ache.

"They're strong fighters," Bush remembers of his trips to the Cape. "Catching a false albie is a great thrill for anyone who loves fly-fishing." But Sellars remembers a lot of quiet time on the boat. "I'm sure it was relaxing for him," Sellars recalls. "When we were fishing, we didn't talk a lot. I think he liked it that way."

The president's North Carolina fishing adventures were kept under wraps, as are those of most other visiting national celebrities. That's a good thing. In this age when paparazzi run the streets chasing after frivolous stories to feed the tabloids, it's good to know there are still some places where even the famous can just relax. ◆

Jay Barnes is the director of the N.C. Aquarium at Pine Knoll Shores and author of "North Carolina's Hurricane History" *(UNC Press), now in its third edition.*

Docking Do's

TOWING AND LAUNCHING A BOAT CAN CAUSE ALL KINDS OF TROUBLE BEFORE YOUR VESSEL EVER GETS WET.

written by **MARK JOYNER**
illustrated by **GARY PALMER**

A boat ramp might strike some people as an unlikely setting in which to ponder the human condition. I'd have to say it's a great one and bears out over time that being on and around the water brings out the best in us. Nowhere will you find more everyday examples of good-heartedness than around a dock or a marina, whether it's assistance with launching a boat or a stranded family being towed across the lake by a total stranger.

There is, always has been, and I hope always will be a kindred spirit among boaters. All boaters know they may one day find themselves on the end of a tow line, and by and large they adhere to the waterman's code. Though the code may be more like guidelines than actual rules, as Captain Barbossa explains in the movie "Pirates of the Caribbean," at least we have guidelines. Which is good, since every Tom, Dick and Harry with a boat will be at the docks

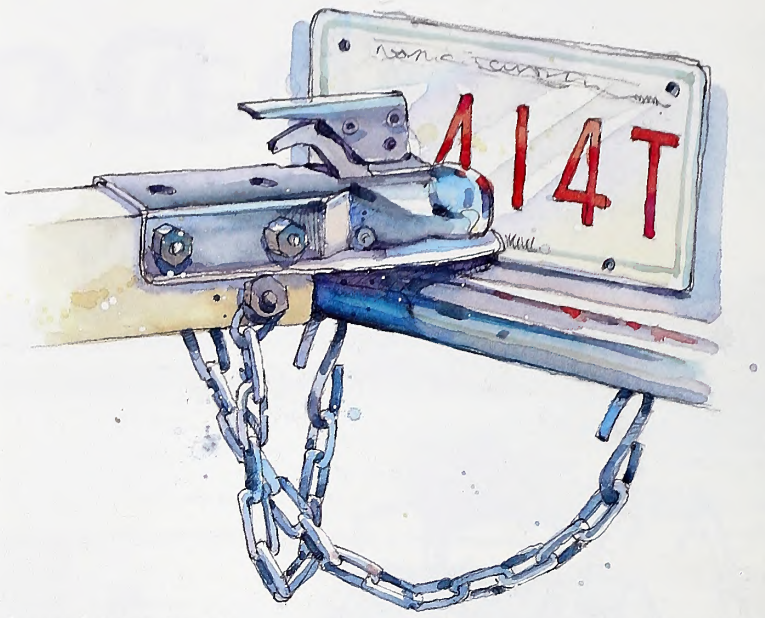
AND DON'TS

TRY THESE TIPS FOR MAXIMUM SAFETY AND COURTESY AT THE BOAT RAMP.

this weekend. It will come as no surprise to learn that dockside skills and etiquette don't always come with the boat.

Hang around a dock any length of time and you'll see the darnedest things, like the first-time boater who neglects to undo the straps and pulls his truck underwater. Or someone pulling the pin on the trailer hitch receiver and sending both boat and trailer into the drink. Every marina has a story, true or not, of some poor soul pulling up to the

WHY THE CRISSCROSS? IF THE TONGUE DOES HAPPEN TO COME LOOSE, THE SHORTENED CHAINS WILL CATCH IT AND PREVENT IT FROM TOUCHING THE GROUND.



dock and complaining that his boat is acting sluggish, only to discover a trailer underneath.

I've had my own moments of less-than-omnipotence, once forgetting to put the drain plug in and barely making it back to shore with my family. It's a humbling experience, to be filed under the heading "That which doesn't kill us hopefully makes us stronger," or at least safer, for our family's sake.

Just for the record, let's review the basic options in a classic missing-plug scenario, beyond switching on the bilge pump. On most boats the drain hole is well out of reach unless you go overboard and turn off the motor, neither of which might be a good idea. Rushing back and tying off at the dock buys time, but you could still sink dockside while waiting to bring up a trailer, even though salvage would certainly be simplified. The best bet seems to be putting the boat aground—and high up at that—where you can safely attend to your problem. You'll still likely get wet and end up looking like a fool, but pride is the first thing to pitch overboard when you're sinking.

T.R.I.P BEFORE YOUR TRIP

The plug incident was years ago, after which my boys and I came up with a system to guard against that particular blunder and a few other choice ones still lying in wait. We conveniently call it the TRIP checklist, easy to remember because each letter stands for an important item to check off before leaving home, much less getting out on the water.

The letter **T** stands for the trailer, which as everyone discovers can be more trouble than the boat, especially if not used regularly. Wheel bearings seize, wiring corrodes, fuses blow, bulbs burn out and tires go flat. And who knew that by some devious design a car's lug wrench won't work on a trailer's wheels? Purchase one that fits immediately, and never be without it. Better yet, offer it to a stranded boater on the side of the road with a flat tire and a perplexed look on his face.

Hitching up isn't all that difficult, but telltale dents in license plates and bumpers attest to the wisdom of having someone watch for you until you've got it down. When the ball's securely in the receiver, lock it in place, hook up the wiring and crisscross the chains. Why the crisscross? If the tongue does happen to come loose, the shortened chains will catch it and prevent it from touching the ground. Even so, may you never have the experience of glimpsing your own boat trying to pass you on the highway, held only by its chains.

R stands for raising the motor, which presumably has been in the down position, allowing it to drain thoroughly, since the last outing. That seems like a rather obvious point, yet I suspect I'm not the only person who's ever pulled away with the motor down and left a scrape in his driveway. I've seen

boats pulled up the ramp and across the parking lot with the motor still down, and it's not a pretty sight.

The letter **I** represents the interior of the boat, which means getting aboard for an up-close look. In North Carolina, "legal" means carrying the proper number of life jackets, which passengers under age 13 are required to wear anytime the boat is underway. Must-haves also include a fully charged fire extinguisher and a sound-producing device, commonly known as a horn, whistle or bell. If you're operating between sunset and sunrise, you must have working running lights and an anchor light displayed when you are anchored. If you see another boater's green light only, that boat is likely traveling from left to right in front of you. If you see red only, the other boat is moving right to left and has the right of way.

Speaking of anchors, more than one person has dropped the hook over the side without checking to see that the other end of the line, the bitter end, is tied off. The maneuver is called a Gilligan, in honor of that hapless castaway from the 1960s television comedy.

While onboard, take a look around to ensure that coolers, tackle boxes and gear won't fly out at highway speeds. I like to insert the key and flip on all the switches, particularly checking the gas gauge. The last thing you need is to run out of gas on big water, so it's better to keep the tank topped off. The prudent mariner goes by the rule of thirds: a third of a tank for going out, a third for returning to port and a third for the unexpected.

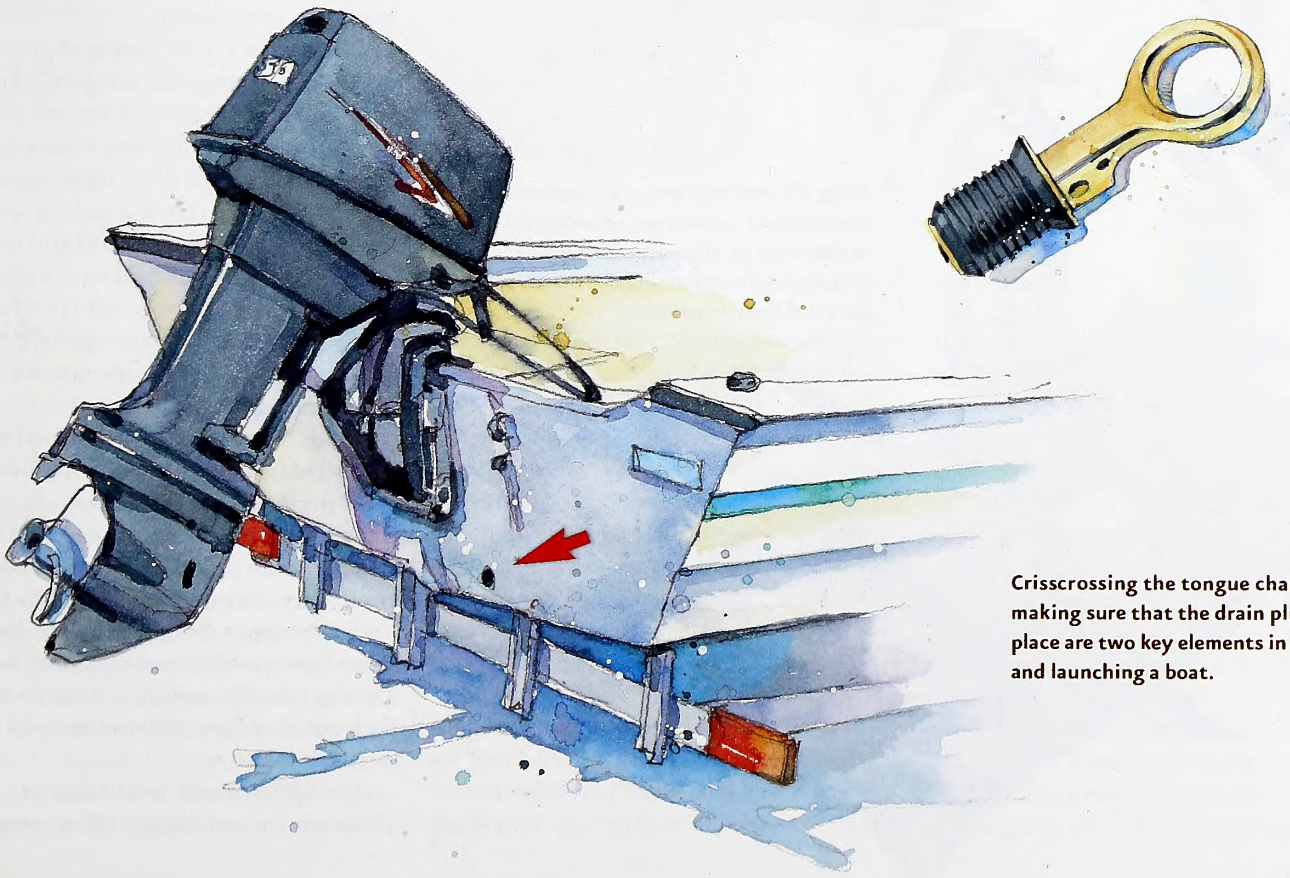
And finally, **P** stands for putting in the plug, presumably left out since the last trip so the boat can drain. If not, you can end up with a boat so heavy it practically sinks upon launching. Now would be the perfect time to ensure it's snugly in place before heading out.

As far as I know, the TRIP system has never been unveiled to the public, but feel free to use it as your own and modify it as needed. An airplane pilot would never think of taking to the air without going through his checklist, and boating is not all that different, whether it's a quick run on the lake or an extended outing at sea. You might come off without the towels or drinks, but at least your basics will be covered.

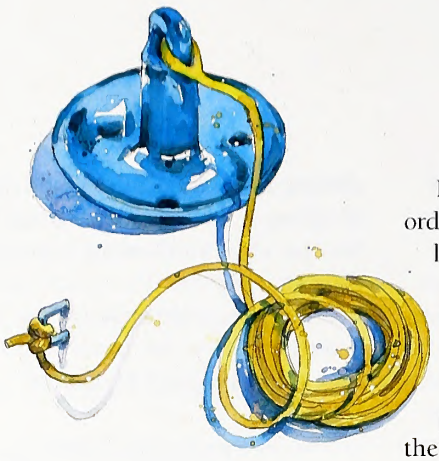
Going backward is tricky

All these measures pay off at the boat ramp, making launching a lot less worrisome so you can worry some about other things—such as boats and trailers crisscrossing backward down steep inclines on slick pavement. However, things usually move along pretty well, a testament to mankind's ability to work together on certain shared ventures.

Of course there's still the fellow who thinks the top of the ramp is a good place to detail his ski boat while others are waiting for their turn. Perhaps he is related to the gentleman who loosely ties off his boat at the dock and then disappears, leaving it to bang around and block a lane.

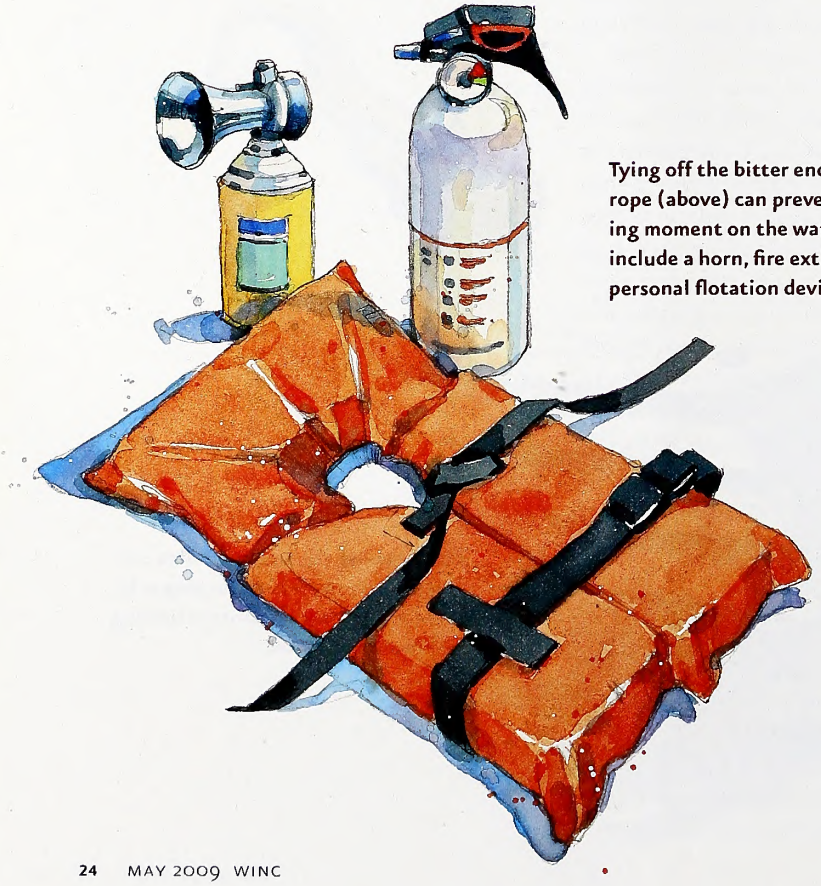


Crisscrossing the tongue chains and making sure that the drain plug is in place are two key elements in hauling and launching a boat.



By and large, though, the process is orderly and courteous, to the point that a lady once tapped politely on my window to ask if she and her husband could watch us back our boat. They had offered to move a friend's boat, but after repeated tries it just wasn't happening. We were glad to help them on their way. They're not alone in having trouble navigating the parking lot. The good news is that it's something that comes with practice, even though that's hard to gain with long lines at a crowded boat ramp.

Conventional wisdom holds that the time spent in those lines should be put to good use for actions such as loading gear, removing boat straps and even putting tops up. But my own experience has been that this often holds things up and can even be dangerous, with people jumping into and out of their vehicles as the line moves. I also don't care to have a buddy (or child) somewhere behind me and out of my line of sight, such as when passing between the vehicle and boat.



Tying off the bitter end of the anchor rope (above) can prevent an embarrassing moment on the water. Safety aids include a horn, fire extinguisher and personal flotation device.

I'd rather stay focused on the activity going on around me and moving when it's time, because I still have one more stop to make at the water's edge. Once there and safely out of everyone's way, I can quickly and easily take care of a few last-minute items. First is to unplug the trailer's electrical wiring; hot bulbs are more likely to explode if left on and plunged into cold water. Besides checking again that the plug is in, this is when I undo the boat straps, including the bowline hook. I take this last step only because I know my boat is heavy enough that it won't endure premature launching, which can happen if plastic pads have been installed.

From there it's an easy maneuver to back down farther until the boat can be floated free. The remaining steps depend on whether or not you've got a seasoned hand in the boat, but here's an interesting tip you might not have thought of: Reversing with a motor trimmed up forces the bow of the boat down, making it harder to float free. Trimming the motor down lifts the bow and helps ease it off. Of course, anytime you're in reverse, the prop is dangerously exposed to submerged hazards, so use caution.

While we're on the subject of props, it's worth considering something called prop walk and how it can work for you when approaching or pulling away from a dock. If your propeller turns to the right, as most all outboards do, the rear of your boat will pull to the right as you go forward and to the left when reversing. If you have a choice, approach a dock on your left (port) side, apply a short burst of reverse at the last minute, and you'll look like a pro as the stern swings neatly alongside.

On the other hand, if you're tied up on your right (starboard) side, going forward kicks the stern up against the dock, sometimes so forcefully that you can't get free. The effect can be greatly accentuated by wind and current. I once watched a boatload of teenagers struggling to free themselves from a dock where they were held by a strong tide. The answer of course was to back out stern first, which eventually they were able to do.

As with Las Vegas, what happens out on a boat stays out on a boat. Still, at some point

OBVIOUSLY THERE'S MORE TO BOATING THAN WHAT HAPPENS AT THE DOCK, BUT NOWHERE ELSE ARE BOAT HANDLING SKILLS AND YOUR CHARACTER SO NOTICEABLY ON DISPLAY TO FELLOW BOATERS.

you'll be back at the docks, and it's time to do it all over again in reverse. That last moment as a boat settles onto its trailer and is pulled from the water marks the end of one trip and the beginning of another.

Over the past few years a particular hazard for retrieving a boat has been low lake levels. Backing too far down a ramp allows the wheels to drop over the outer edge of the ramp, and that's not good. At Kerr Lake I witnessed an axle torn off a trailer this way, when it probably could have been avoided.

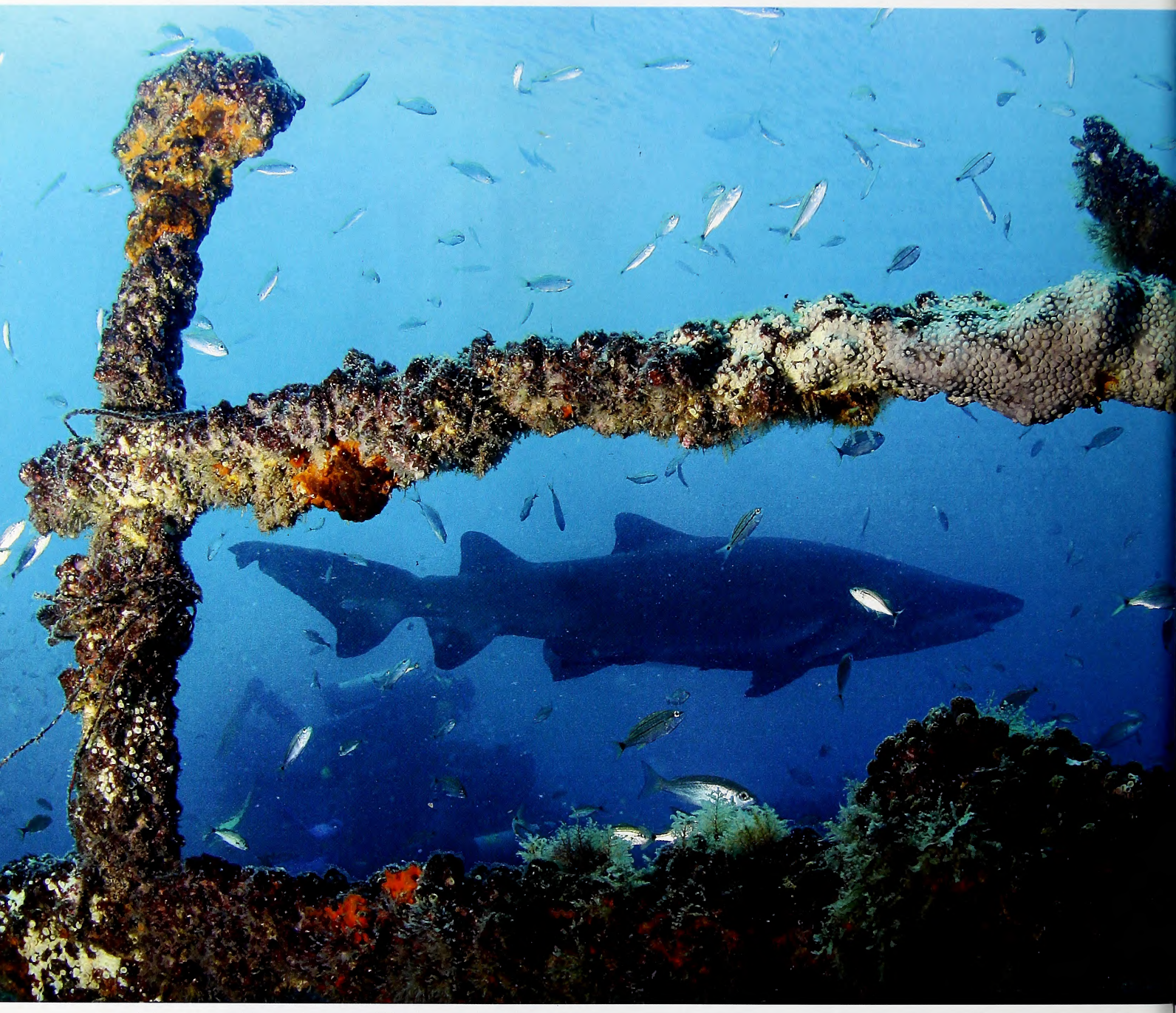
If it happens to you, probably the best thing to do is float the boat back off to lighten the trailer, and then coax the empty and lighter trailer up and over the edge. A friend and I once had to do this by piling up a few rocks at the base of the drop-off to make a mini-ramp.

Ironically, what sometimes makes the situation worse is boaters powering up onto their trailers using their motors rather than winching up that last distance. Over time, prop wash blasts out the sand and sediment around the ramp, leaving a hole to trap trailer tires and creating a mound on which a boat bottom can hit.

Obviously there's more to boating than what happens at the dock, but nowhere else are boat handling skills and your character so noticeably on display to fellow boaters. Apparently a few people still don't get this: The line to take vessels out is formed by the vehicles with trailers, not the boats waiting in the water. In other words, don't block a lane if your tow isn't queuing up next.

In the end it may come down to simple etiquette, shown in ways such as turning off your headlights when launching at night so as not to blind others. Whether you're new to boating or an old salt, observance of a few do's and don'ts at the docks can only make things go more smoothly at these portals between land and water. ◆

Mark Joyner is executive vice president of the N.C. Aquarium Society and a frequent contributor to Wildlife in North Carolina.



Swimming WITH TIGERS

written and photographed by Todd Pusser

Sand tiger sharks are some of the most ferocious-looking predators in the ocean. However, these large, toothy beasts pose no apparent threat to scuba divers.

Sand tiger sharks are beautiful creatures. Reaching lengths of up to 10 feet, they have one of the most distinctive profiles of the 400 or so species of sharks swimming in the world's oceans today. Their bodies exhibit a lustrous golden brown color and are often decorated with dark spots. They have muscular bodies characterized by a strongly arched back that slopes down to a narrow snout.

What separates sand tigers from other species of sharks is what lies at the business end of that narrow snout: a mouth full of protruding, jagged, pointed teeth in need of some serious orthodontic care. This ferocious mug has made sand tiger sharks popular exhibit animals at aquariums around the world, graced the cover of countless shark books, and given swimmers, scuba divers and dentists nightmares.

But even with their large size and nasty-looking dentition, sand tiger sharks actually seem quite harmless to divers, behaving more like giant pussycats than like their ferocious feline namesakes. However, they do exhibit one extraordinary behavior that should give any diver pause: a nasty habit of eating their own siblings while still in their mother's womb! Chew on that little piece of trivia for a moment, and I will return to it later.

North Carolina is renowned for having a healthy population of sand tiger sharks residing off its coast. Scuba divers the world over flock to our shores each year for the chance of diving with sand tiger sharks. You might wonder why anyone in their right mind would intentionally seek out and swim with large predatory fish that have—at least some species have—from time to time included humans as a dietary supplement. This might be true for species such as the great white and bull sharks, but the sand tiger shark has never been recorded as devouring a human being.

A sand tiger shark's dozens of wicked-looking teeth belie its docile nature toward humans. It uses those teeth to consume many different types of carrion and live prey, including other sharks.

Since divers first discovered sand tiger sharks congregating around shipwrecks off the North Carolina coast in the early 1980s, there has not been a single recorded attack. Still, there is a first time for everything. With their large body size and a mouth full of sharp teeth, sand tiger sharks command respect.

AN EARLY OBSESSION

I have always been fascinated by sharks. I remember, as a child, eagerly waiting for the adventures of Jacques Cousteau to come on television on Sunday afternoons. I would sit, riveted to the screen, watching the amazing underwater footage of divers swimming with sharks of all kinds. Later, walking through a large underwater acrylic tunnel at Sea World, I first encountered sand tiger sharks. Sand tigers are hardy animals and do very well in captivity. I remember standing in awe, watching the silent predators glide inches above my head, mouths agape, with a hungry glint in their eyes. To say I was obsessed with sharks as a kid is a bit of an understatement. I even took a small sandbar shark that my father and I caught off the Cherry Grove (S.C.) Fishing Pier to show-and-tell in my kindergarten class. And yes, I had a rubber shark to play with in the bathtub until I was at least seven years old.

As an adult, I have continued to pursue my passion for sharks, making trips specifically to photograph them in the wild. I have jumped in cages with great white sharks off Mexico, swum with silky sharks as they shadowed pilot whales in the Bahamas, seen whale sharks feeding on plankton at the surface off the coast of Texas, watched a thresher shark leap completely out of the water in the Sea of Cortez, and taken scalloped hammerhead sharks on a longline with UNC-Chapel Hill shark biologist Frank Schwartz. However, I had never swum with the sand tiger sharks that swarm the wrecks off the Carolina coast. Last summer I made it a point to change all that.

TAKING THE PLUNGE

As a birthday gift to myself, I joined a dive group off the coast of Wilmington last August. Our target was the wreck of the *Hyde*, sitting in 85 feet of water. The *Hyde* was a 215-foot dredge that was sunk by the N.C. Division of Marine Fisheries 18 miles offshore of Masonboro Inlet in 1988. I dove the wreck in 1994, but no sand tiger sharks were on it at the time. However, it seems that over the last several years during the summer months, sand tiger sharks have shown up in large numbers. I was eager to see the sharks up close in the wild, instead of staring at them through an acrylic pane at an aquarium.

I have heard the statistics repeated often during Discovery Channel's Shark Week. You have a greater chance of getting killed in a car accident driving to the beach than being attacked by a shark. You have a greater chance of being struck by lightning or maimed by a dog or even a pig than of being bitten by a shark. University of Miami shark biologist Sam Gruber once remarked that more people have been killed by having soda machines topple over on them than have been killed by sharks.

All of those stats and anecdotes were momentarily forgotten when I found myself sitting on the stern of the *Hyde* 45 feet below the surface

Sand tiger sharks, unlike any other shark species, have the unique ability to remain absolutely motionless in the water column.

Sand tiger sharks can become entangled in gear (top) from anglers fishing on wrecks and reefs. Male sharks are identified by reproductive appendages known as claspers between their pelvic fins. Amberjack (below) prey on the baitfish that huddle close to sand tiger sharks for protection.

and surrounded by dozens of sharks. Larger than my living room sofa, they swam by slowly, teeth inches away from my head. Apprehension soon gave way to curiosity as I took in the scene around me. The sand tiger sharks completely ignored the divers and seemed to consider us just part of the wreck.

Fumbling with the controls of my camera, I finned off the stern and slowly approached a shark that was hovering motionless near the mast of the *Hyde*. Sand tiger sharks, unlike any other shark species, have the unique ability to remain absolutely motionless in the water column. They do this by rising to the surface and gulping air. The resulting air bubble in the stomach acts as a neutral buoyancy control, allowing them to remain stationary in the water column—a perfect subject for a photographer. When caught by fishermen, sand tiger sharks sometimes release this air forcibly through their mouths, earning them the unflattering name of belching sharks.

The *Hyde* was absolutely covered with marine life. Schools of Atlantic spadefish circled above the wreck. Enormous clouds of baitfish, consisting of cigar minnows and juvenile vermillion snapper, swirled to and fro in perfect synchrony, like some giant underwater tornado.

It was interesting to note that many schools of baitfish clustered tightly around the sand tiger sharks. Some biologists believe that the small baitfish use the sand tiger sharks for protection from larger predatory fish such as jacks and tuna. As I photographed the underwater bonanza, a swarm of baitfish moved away from the safety of a sand tiger shark and was immediately attacked by a large school of amberjack, giving credence to the "big brother" theory.

SIBLING RIVALRY

Sand tiger sharks are around 7 feet long when they reach sexual maturity. As with all sharks and rays, males can easily be distinguished from females by a pair of reproductive organs known as claspers hanging near their pelvic fins. As I swam around the *Hyde*, I noticed that all the sharks were females. Some had oval scars on their backs where males had bitten them during the mating act.

A female sand tiger's eggs are fertilized internally. The embryos develop in paired uteri, or wombs, and are nourished by the yolk sac rather than the mother's body (there is no placenta).

One study estimated that more than 100 million sharks are killed by people each year.

Studies have shown that when an embryo reaches about 10 centimeters in length, it begins to develop teeth. At this point the largest embryo in each womb begins to hunt and eat its smaller siblings and any unfertilized eggs. And you thought the fights with your siblings were bad when you were a kid!

After a gestation period of between nine and 12 months, female sand tiger sharks give birth to two live pups, one from each uterus. The two babies are born measuring around 3½ feet in length and can hunt and catch prey on their own immediately. No maternal care is given.

ENDANGERED RESOURCE

Swimming along the hull of the *Hyde*, I noticed something strange hanging from the side of one of the larger sand tiger sharks. As I swam closer, I saw that a fisherman's lure was dangling from the side of the shark. The hooks were embedded deep within the flesh just below the dorsal fin. Monofilament line trailed behind the shark like a long kite string. No doubt a fisherman had foul-hooked this shark, likely while fishing for the large amberjack or mackerel that are common on this wreck.

My immediate reaction was to swim over to the shark and try to remove the lure with my bare hands. But upon closer inspection, I realized that this would be a futile attempt. The hooks were embedded too deep, and the sand tiger probably would not realize I was trying to help and may have taken off a limb or two in the process. Worse yet, I probably would have impaled my own hand on the hooks of the large lure and become a human remora, permanently attached to the side of the shark as it swam the ocean blue. So I just watched the shark slowly circle the wreck. She appeared to be in good health and no worse for the wear with her jewelry dangling from her side.

Seeing that large female shark with the fishing lure stuck to her brought to mind an important point. Shark populations are plummeting throughout the world's oceans. Commercial fishermen target sharks for fins, meat, liver oil, skin, cartilage, teeth and jaws. Perhaps the greatest threat is the escalating trade in shark fins for shark fin soup, a delicacy throughout Asian countries. One study estimated that more than 100 million sharks are killed by people each year. With that kind of fishing pressure, it is no wonder many sharks are protected species.

Populations of sand tiger sharks are protected off the coasts of Australia and South Africa and along the East Coast of the United States. Due to the fact that sand tigers are slow to reach sexual maturity and produce only two offspring at a time, they are particularly susceptible to unregulated fishing pressures.

A STATE TREASURE

North Carolina is fortunate to have a healthy population of sand tigers off its shore. Their mere presence brings hundreds of thousands of dollars to the local economy as divers travel here from around the world for the thrill of viewing these gentle predators close up in their natural environment.

All three North Carolina Aquariums exhibit sand tigers. Over the years, their toothy grins have enthralled, inspired and educated millions of children and adults about the wonders of the sea and its inhabitants. For me, the sand tiger sharks hovering above the wreck of the *Hyde* represent a healthy ocean environment. In a world of declining biodiversity, it is comforting to know that just off our state's shores lie wrecks so rich in life.

I can't wait to suit up again this summer and swim with the sand tigers on the *Hyde*. Of course, I will drive carefully to the beach, I will not pet any strange dogs while there and I will use extra caution when depositing coins into the soda machine. ◆

Todd Pusser is a marine biologist, a professional photographer and a frequent contributor to WINC.

From fiddler crabs to fish hawks, countless creatures start their lives in North Carolina's tidal wetlands. These salt marsh nurseries could also be called

Cradles in the Cordgrass

written by Julie Dunlap / illustrations and nature activity by Anne M. Runyon

The salt marsh itself begins with cordgrass. A wave-washed mudflat catches a few seeds in spring, and up sprout the narrow, leathery leaves of *Spartina alterniflora*, or smooth cordgrass. Yard grass and most other plants would die if tides flooded over them twice each day. But cordgrass has special glands that squeeze extra salt from the plant. As the baby green blades grow taller, cordgrass roots form an interconnected mat that collects sediment and helps build up the marshland.

Though salt marshes make up only about 5 percent of wetlands, you can find them scattered along the Atlantic coast from Florida to Canada, including North Carolina's barrier islands and mainland coast. In one sunny summer, smooth cordgrass can grow as fast as plants in a rainforest.

Marsh periwinkles travel up and down blades of cordgrass, staying just above the rising tide. When their oval eggs hatch in the water, the young drift with other plankton until ready to find blades of their own.

BABY FOOD

Living *Spartina* leaves are too tough for most animals to chew. But when the grass turns brown and dies each fall, billions of bacteria munch it into bits. One result of the decay process, as the microorganisms multiply and spread through the muck, is the rotten-egg smell at low tide. But the microbes are also making detritus, dead plant matter that fuels the salt marsh food web.

Fiddler crabs feast on detritus, algae and dead animal parts they find while scrambling across the marsh mud. Well-fed fiddler males can attract females into their burrows to mate, and, in two weeks, the females emerge to release eggs into the ebbing tide.

Flood tides deliver the tiny young, or zoeae, of crabs, shrimp and other crustaceans, plus just-hatched snails and other mollusks, to the marsh. These zooplankton drift with the water, and some cannot escape from mussels and oysters that filter seawater to eat. But many survive and grow, feeding on the nutrient-rich detritus stew.

Wrack is a floating pile of dead *Spartina* grass that can wash ashore and offer food and shelter to crabs and other small animals.

Saltmarsh skippers are small butterflies that sip the nectar of flowering marsh plants. Their caterpillars feed on a spiky plant called seashore saltgrass.

ONE FISH, TWO FISH

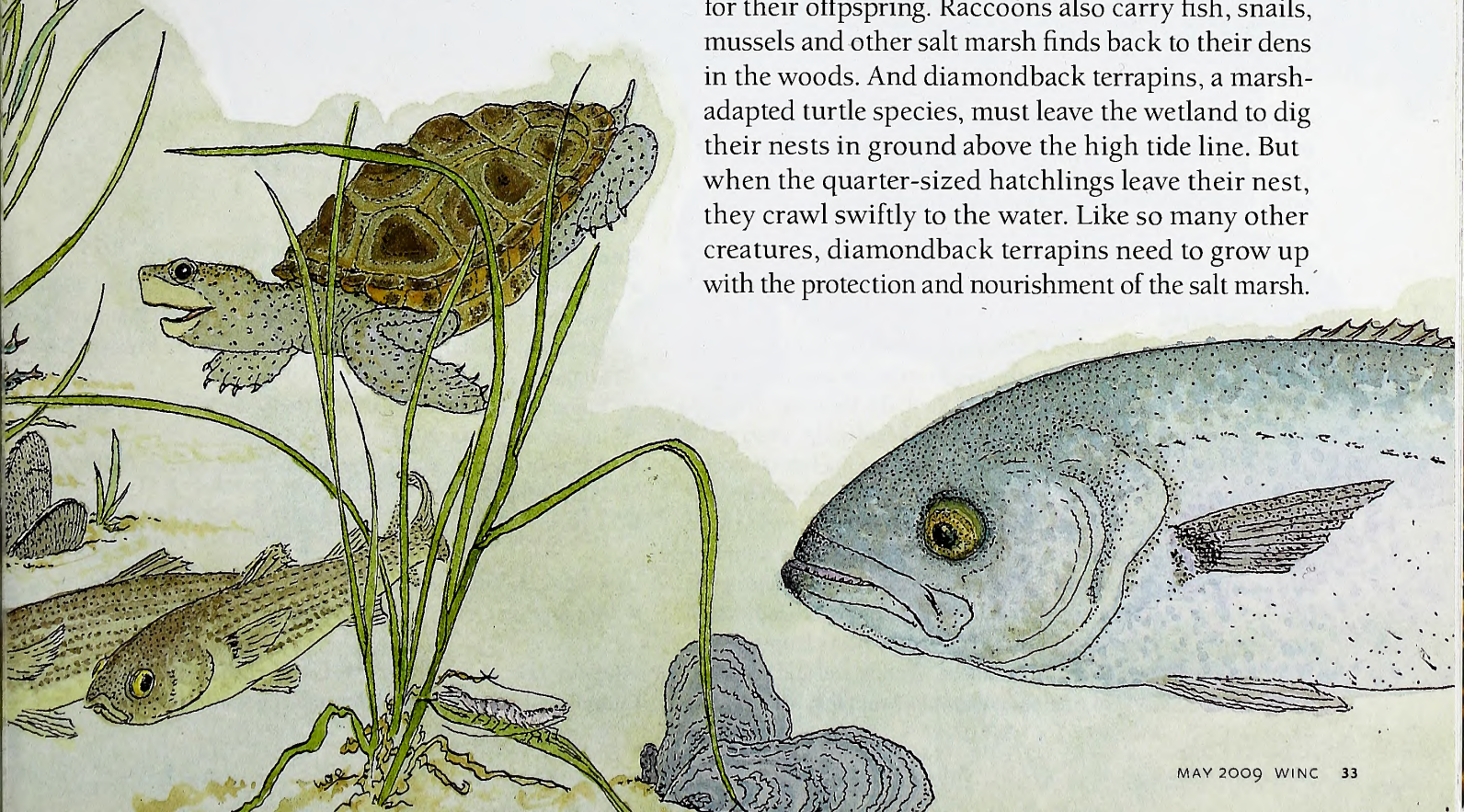
As they fatten, infant invertebrates lure assorted backboned animals into the wetland. Salt marshes are famous as nurseries for ocean fish, which often hatch from eggs laid in open waters but soon ride the waves toward shore. The fragile young need calm waters, sheltered by cordgrass, especially when winter nor'easters stir up the ocean surface. At high tide, fish larvae glide through the marsh, snatching zoeae, mosquito larvae or detritus from the water. Cordgrass roots and submerged blades offer lots of hiding places from bigger fish and raccoons, herons or other animals that would like fish for a morning snack.

It's tougher to hide when the tide falls and the young fish must retreat to a maze of salty creeks cutting through the marsh. Large bass and bluefish make their way up the deepest streams to dine on flounder, spot, silversides and other species. Luckily, plenty still find safe pools and sheltering roots to hide behind. Ocean fish that live to maturity return to the sea, and much of the finned food that ends on your dinner plate got its start in the salt marsh.

ROCKABYE BIRDIE

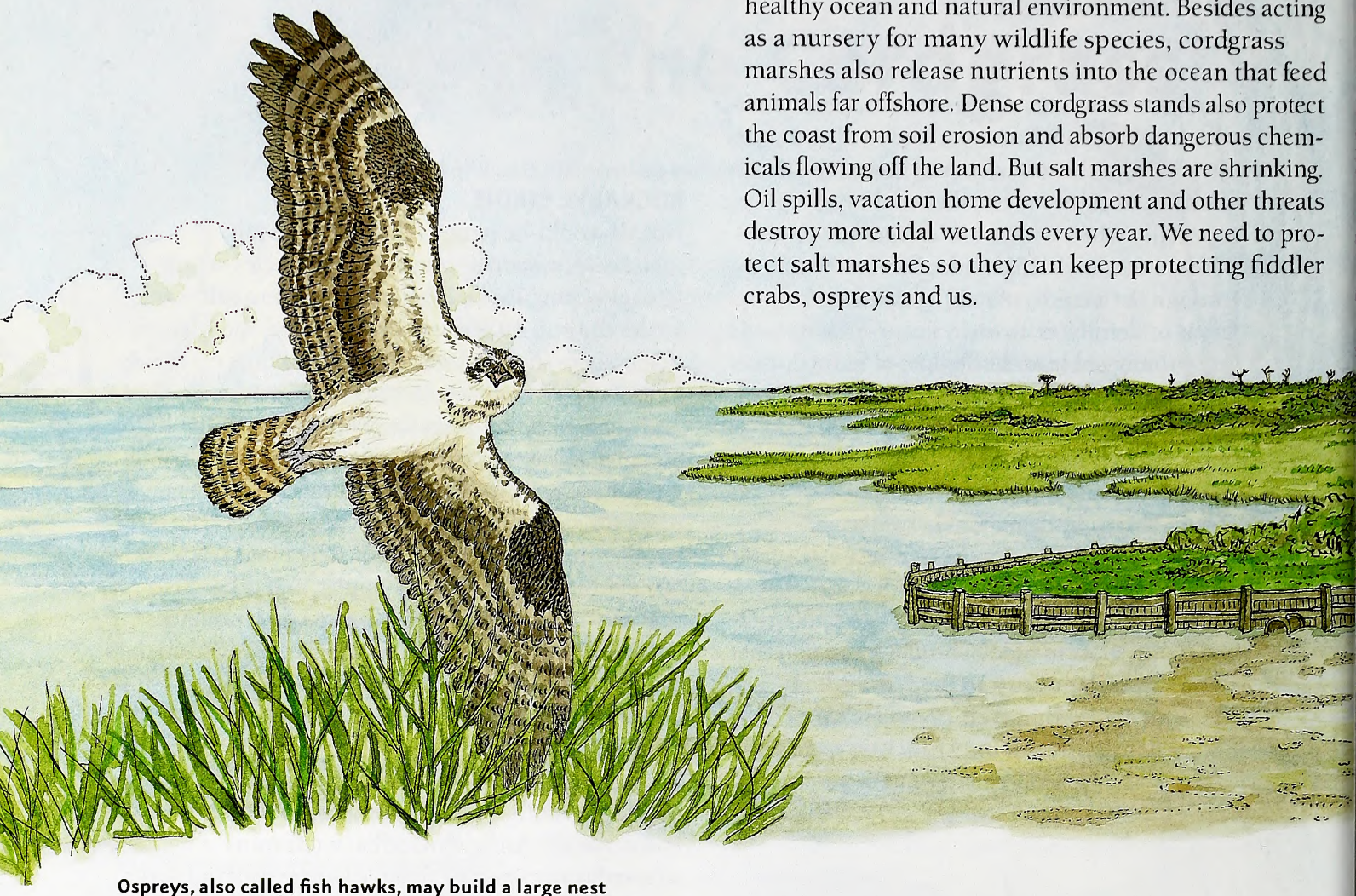
Not all would-be parents drawn to the salt marsh are aquatic animals. Many species set up housekeeping in the high marsh, where salt water soaks the soil only during storms and the highest tides. There the dead stems of saltmeadow cordgrass (*Spartina patens*) collect in mats thick enough for mice and voles to build nests for their litters. Other high marsh plants, such as black needlerush and saltmarsh bulrush, support the basket-like nests of marsh wrens, red-winged blackbirds and other songbirds. The bird families grow quickly, nourished by plant seeds and by caterpillars, dragonfly nymphs, and other insects that see the marsh as a nursery for bugs, not birds.

Even some animals that nest or den away from the marsh may depend upon it for their youngsters' survival. Great blue herons often nest in tall trees, but the parents fly to a nearby marsh to hunt fish and crabs for their offpspring. Raccoons also carry fish, snails, mussels and other salt marsh finds back to their dens in the woods. And diamondback terrapins, a marsh-adapted turtle species, must leave the wetland to dig their nests in ground above the high tide line. But when the quarter-sized hatchlings leave their nest, they crawl swiftly to the water. Like so many other creatures, diamondback terrapins need to grow up with the protection and nourishment of the salt marsh.



OCEAN A,B,C

Salt marsh nurseries are important building blocks of a healthy ocean and natural environment. Besides acting as a nursery for many wildlife species, cordgrass marshes also release nutrients into the ocean that feed animals far offshore. Dense cordgrass stands also protect the coast from soil erosion and absorb dangerous chemicals flowing off the land. But salt marshes are shrinking. Oil spills, vacation home development and other threats destroy more tidal wetlands every year. We need to protect salt marshes so they can keep protecting fiddler crabs, ospreys and us.



Ospreys, also called fish hawks, may build a large nest of sticks on human-built platforms above a salt marsh. Their young grow strong on the many fish the parents catch from the wetlands and surrounding waters.

Get Outside

Get to know a salt marsh nursery. Visit one of the North Carolina Coastal Reserves (www.nccoastalreserve.net) or another park or refuge that protects tidal wetlands. Often, the best way is to join a field trip, with a leader who knows about boardwalks, observation platforms or kayak trails where you can observe the habitat closely. Remember to look at every level for signs of young life. In the mud, you may see fiddler crabs courting or ducking into burrows to mate. A guide can help net a few young fish or collect a water sample to check under a microscope for crab or shrimp zoeae. Among the grasses look for bird nests and caterpillars, and overhead, watch for ospreys carrying fish to young on a nearby nest platform. Don't forget to use all your senses. The smells, sounds, feel and even taste (cordgrass is salty!) of tidal marshes are memorable too.

Read and Find Out

- "Following the Coast" by Jim Arnosky, HarperCollins, 2004.
- "Diamonds in the Marsh: A Natural History of the Diamondback Terrapin" by Barbara Brennessel, University Press of New England, 2006.
- "Marshes: The Disappearing Edens" by William Burt, Yale University Press, 2007.
- "A Day in the Salt Marsh" by Kevin Kurtz, Sylvan Dell Publishing, 2007.
- "America's Wetlands" by Frank Staub, Carolrhoda Books, 1995.

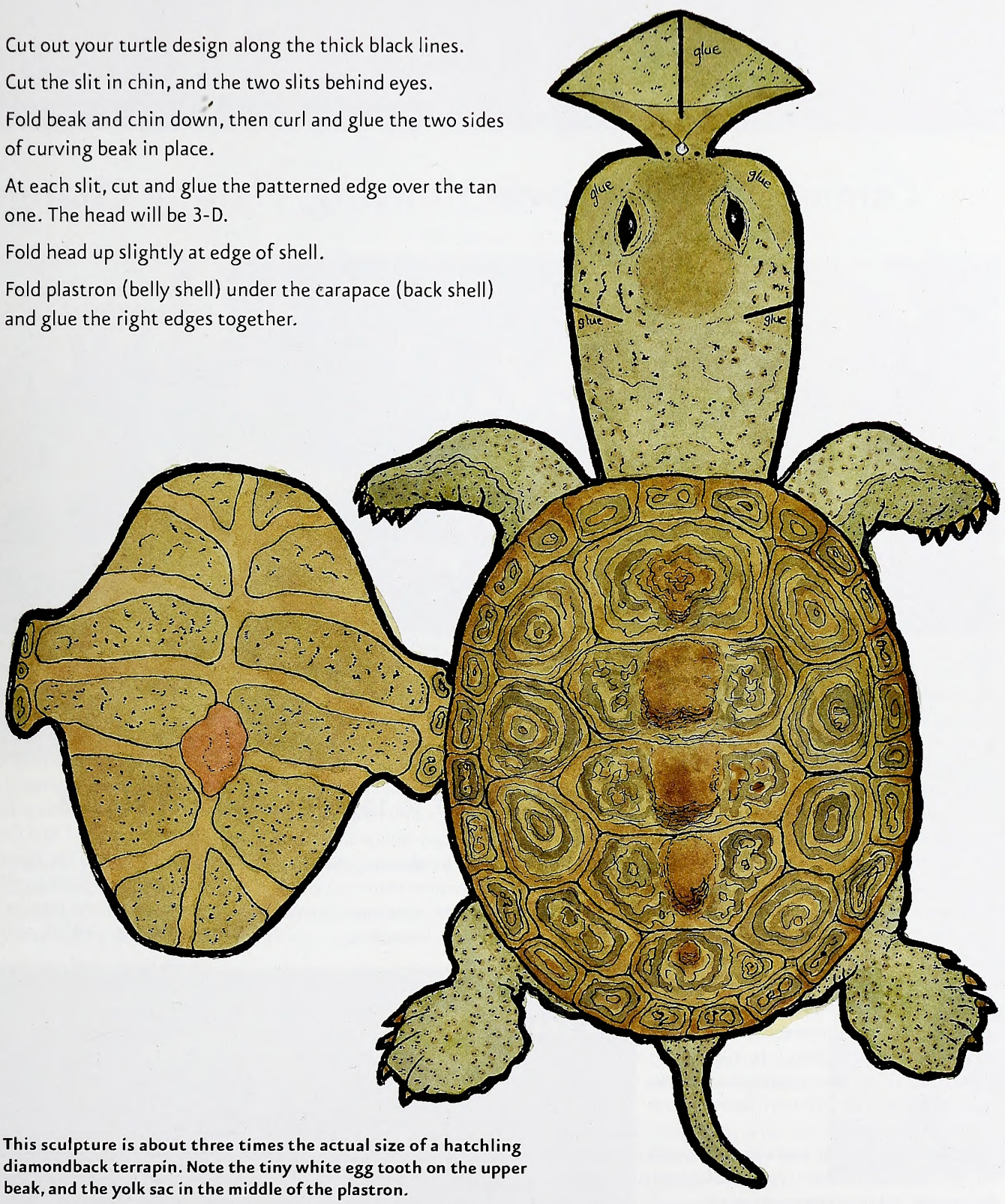
In *Wildlife in North Carolina:*

- "At Large on Cedar Island" by Bland Simpson, February 1997.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make a Hatchling Diamondback Terrapin Sculpture

1) Cut out your turtle design along the thick black lines.
2) Cut the slit in chin, and the two slits behind eyes.
3) Fold beak and chin down, then curl and glue the two sides of curving beak in place.
4) At each slit, cut and glue the patterned edge over the tan one. The head will be 3-D.
5) Fold head up slightly at edge of shell.
6) Fold plastron (belly shell) under the carapace (back shell) and glue the right edges together.



This sculpture is about three times the actual size of a hatchling diamondback terrapin. Note the tiny white egg tooth on the upper beak, and the yolk sac in the middle of the plastron.

This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Commission Approves Hunting, Fishing Changes

MELISSA McGAW / NCWRC

MELISSA McGAW / NCWRC

The commission held nine public hearings to air hunting and fishing proposals.

The N.C. Wildlife Resources Commission has approved dozens of changes to state hunting, fishing and trapping regulations which will take effect on July 1.

After a yearlong process of careful consideration and review of some 40,000 public comments received online and at nine public hearings held across the state in January, the 19-member commission voted on the proposed regulations changes at its March 4 meeting.

Of particular interest to deer hunters statewide, the commission voted to extend by one week the muzzleloader season for deer, creating a two-week season. Additionally, commissioners approved extending the gun deer season for counties under the Northwestern deer season through Jan. 1. In 2008, the Northwestern gun season ended on Dec. 20. Eastern, Central and Western deer seasons remain unchanged.

Proposals to alter the statewide spring wild turkey season generated substantial interest during the public comment period. Commissioners ultimately voted to retain the current wild turkey season structure.

Also approved was a proposal to allow bowhunting on Sundays on private lands, with the exception of migratory game birds. Sunday bowhunting on game lands was disapproved. Sunday hunting on public and private lands by falconers also was approved, again with the exception of migratory game birds.

The commission also approved a slate of proposals affecting trout, bass and crappie fishing in inland waters, and reduced the allowable take of grass carp by bow and arrow on certain reservoirs. In addition, a hunting proposal that would require hunters to attach a physical tag to big game at the site of harvest was tabled for further deliberation.

"Over the course of the past year, the members of the Wildlife Resources Commission vigorously reviewed, discussed and debated each of these rule proposals as they considered staff and public input," said Gordon Myers, executive director of the agency. "Today's actions reflect the commission's dedication to the core governance process necessary to manage the state's wildlife resources."

IN SEASON

This month, these seasons are open in North Carolina:

Hatchery Supported Trout Waters: Through Feb. 28, 2010.

Wild Turkey (Male or Bearded Only): Through May 9.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria.

There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2008–2009 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

CRFL Funds Headed to 11 Projects

Revenues from the N.C. Coastal Recreational Fishing License (CRFL) will pay nearly $2 million this year toward projects to help provide coastal fishing access and fisheries and habitat research.

The N.C. Marine Fisheries Commission and the N.C. Wildlife Resources Commission approved 11 grants totaling $1.99 million from the N.C. Marine Resources Fund. This is the first set of grants awarded from CRFL revenues, other than in-house projects of the Division of Marine Fisheries or the Wildlife Commission.

"I feel we are off to a good start putting saltwater license money to work," said Mac Currin, Marine Fisheries Commission chairman. "There is a good balance of new and improved angler access, research needed for better management, and habitat enhancement."

"The N.C. Wildlife Resources Commission and the Marine Fisheries Commission staffs collaborated to review and recommend authorized projects funded from the sale of Coastal Recreational Fishing Licenses," said Wes Seegars, chairman of the Wildlife Commission. "There is a tremendous need for public access to coastal waters, and three of these projects increase boating and fishing access."

Grants were sorted into three focus areas: people, $947,500; fish, $619,096; and habitat, $422,970. "These were the areas where we felt there was the greatest funding need," said Louis Daniel, director of the N.C. Division of Marine Fisheries.

"We look forward to funding future projects that will benefit aquatic habitats, obtain important information on managing sport fisheries, and provide recreational fishing opportunities," said Gordon Myers, director of the Wildlife Commission.

North Carolina began requiring a license for fishing in coastal waters on Jan. 1, 2007. Revenues from license sales go into two different funds, depending on the type of license. Expenditures must be used to manage, protect, restore, develop, cultivate, conserve and enhance marine resources. Revenues from the sale of all lifetime coastal fishing licenses and a portion of the lifetime unified hunting and statewide fishing licenses go into the N.C. Marine Resources Endowment Fund. Only the interest of this account may be spent.

Revenues from the sale of annual and 10-day coastal fishing licenses and a portion of the annual unified hunting and statewide fishing licenses go into the N.C. Marine Resources Fund. Spending may come from the principal of this account. Spending from either of the funds must be approved by both of the commissions.

There were 19 applications for grants submitted, requesting $2.2 million from the N.C. Marine Resources Fund. Projects chosen for funding included the following:

$25,000 for Take a Kid Fishing

$300,000 for a boating access area on Bricklanding Road in Brunswick County

$122,500 for a boating access area at Cedar Point in Carteret County

$500,000 for a boating access area at Snow's Cut in New Hanover County

$98,828 for a study of the movement and mortality of spotted sea trout by the N.C. State University Center for Marine Sciences and Technology

$496,527 for DMF to develop a comprehensive recreational fishing data collection program

$23,741 for a UNC-Wilmington king mackerel tournament text message catch and effort reporting program

$44,665 for an N.C. State University study of the spawning characteristics of blueback herring

$135,325 to enhance the DMF review of coastal development permits

$132,242 for a UNC Institute of Marine Sciences project to test alternative designs of planting oyster seed

$110,738 for the Albemarle-Pamlico National Estuary Program to develop a submerged aquatic vegetation monitoring program

Purple Finch: Harbinger of Climate Change

When it comes to global warming, the canary in the coal mine isn't a canary at all. It's a purple finch.

As the temperature across the U.S. has gotten warmer, the purple finch has begun spending its winters more than 400 miles farther north than it used to. And it's not alone.

An Audubon Society study found that more than half of 305 bird species in North America, a hodgepodge that includes robins, gulls, chickadees and owls, are spending the winter about 35 miles farther north than they did 40 years ago.

The purple finch was the biggest northward mover. Its wintering grounds are now more along the latitude of Milwaukee, Wis., instead of Springfield, Mo.

Bird ranges can expand and shift for many reasons, among them urban sprawl, deforestation and the supplemental diet provided by backyard feeders. But researchers say the only explanation for why so many birds over such a broad area are wintering in more northern locales is global warming.

Over the 40 years covered by the study, the average January temperature in the United States climbed by about 5 degrees Fahrenheit. That warming was most pronounced in northern states, which have already recorded an influx of more southern species and could see some northern species retreat into Canada as ranges shift.

"This is as close as science at this scale gets to proof," said Greg Butcher, the lead scientist on the study and the director of bird conservation at the Audubon Society. "It is not what each of these individual birds did. It is the wide diversity of birds that suggests it has something to do with temperature rather than ecology."

MASLOWSKI PRODUCTIONS

The study provides compelling evidence for what many birders across the country have long recognized — that many birds are responding to climate change by shifting farther north. Previous studies of breeding birds in Great Britain and the eastern U.S. have detected similar trends. But the Audubon study covers a broader area and includes many more species.

The research is based on data collected during the Audubon Society's Christmas Bird Count in early winter.

Putt Earns Fifth N.C. Duck Stamp Honor

Wildlife artist Gerald Putt's portrayal of a trio of American wigeons has been selected as the 2009 North Carolina Waterfowl Conservation Stamp and Print. The acrylic portrait, which depicts wigeons resting among cattails, was unveiled in February at the 14th Annual East Carolina Wildlife Arts Festival and the N.C. Decoy Carving Championships at the Washington Civic Center in Beaufort County.

This marks Putt's fifth honor as artist for the state's waterfowl conservation stamp and print, also known as the N.C. duck stamp. He has also won Pennsylvania's prestigious duck stamp contest an unprecedented eight times, more than twice that of any other artist.

Putt was one of more than 30 wildlife artists from across the United States to submit entries for the second annual State of North Carolina Waterfowl Conservation Stamp Competition. In 2008, the N.C. Wildlife Resources Commission partnered with the East Carolina Wildfowl Guild to conduct a nationwide competition open to the public. At the inaugural competition, more than 50 wildlife artists from the United States, the United Arab Emirates and Mexico submitted entries, with Minnesota artist Scot Storm taking top honors.

In addition to Putt's portrait, four other paintings were unveiled during the reception. They were: second place, Jon Ren of Princeton, WVa.; third, Storm of Freeport, Minn.; fourth, J. P. Edwards of Raleigh; and fifth Hank Buffington of Lancaster, Pa.

Signed and numbered regular edition prints with mint stamps of the winning portrait will be available from the Commission on July 1 for $145. The stamp is $10. Proceeds from sales of the print and stamps will go to the Commission's Waterfowl Fund, which generates revenue for the conservation of waterfowl habitat in North Carolina.

CALENDAR OF EVENTS

SATURDAY–SUNDAY, MAY 2–3

Buy, sell or trade at the Dixie Gun & Knife Classic in the Jim Graham Building on the N.C. State Fairgrounds in Raleigh.
Visit www.dixiegunandknifeshow.com.

FRIDAY–SATURDAY, MAY 22–23

Explore the paleontology of the Coastal Plain at the 16th annual Aurora Fossil Festival in Aurora.
Visit www.aurorafossilmuseum.com.

SATURDAY–SUNDAY, MAY 23–24

Experience the sixth annual White Squirrel Festival in Brevard. Contact (828) 884-3278.
Visit www.brevardnc.org.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented ond should be submitted at least four months in advonce to jim.wilson@ncwildlife.org, or coll (919) 707-0177.

New Gar Record-Holder Gets Assist from Web

A 16-foot rod, a tube jig and an iPhone helped Kelly Williams land the latest state-record freshwater fish. The Virginia Beach, Va., angler reeled in a 25-pound longnose gar measuring 53½ inches in length and 18½ inches in girth from the Intracoastal Waterway near Coinjock on Jan. 30 while fishing with his neighbor Glenn Cooper.

NCWRC

Williams and Cooper were fishing for striped bass in about 6 feet of water when Williams hooked the monster gar. After a brief fight in which Williams was sure the fish was going to break his rod, he finally got it in the boat and saw that it was huge.

Despite the size of the fish, Williams said he was planning to release it when Cooper pulled out his iPhone and downloaded the freshwater fish state record information from the N.C. Wildlife Resources Commission's Web site.

"Glenn got on his phone and pulled up a picture on the Web site of the other state record, and it looked kind of skinny by comparison," Williams said. "So it was a good thing he was with me. Otherwise, I'd have let it go if I was fishing by myself."

Kevin Dockendorf, a fisheries biologist with the commission, verified the catch. In North Carolina, longnose gars are found statewide, but are most abundant in coastal rivers and streams. They are the only species of gar found in the state.

Williams' catch surpasses the previous record, held by Sebastian Lankiewicz of Jacksonville since June 2006, by nearly 6 pounds and 4 inches.

To qualify for a state record, anglers must have caught the fish on a rod and reel, must have the fish weighed on a certified scale witnessed by one observer, have the fish positively identified by a qualified expert from the commission and submit an application with a full, side-view photo of the fish. Find current state records at www.ncwildlife.org.

How Do Herons Capture Prey?

written by Clyde Sorenson
illustrated by Jim Brown

MOST HERONS ARE EXPERT ANGLERS, able to catch and subdue large, swift-moving prey. They have a number of physical and behavioral adaptations that enable them to efficiently capture fish.

Less a spear than a large, sharp set of forceps, the bird's bill is formed to penetrate water easily. The tongue and the sharp margins of the bill are usually slightly serrated to help the bird hold its wriggling prey.

The characteristic "S"-shaped curve of the heron's neck is due to an elongated sixth vertebra in its neck. Very strong ligaments run the length of the bird's neck. The elongated sixth vertebra functions much like a "throwing stick" lever, launching the bird's head and bill in a very straight line at very high speed. The ligaments also stabilize the neck and help protect it from injury during the strike.

Most herons have large, acute eyes that are positioned on the head so the bird has excellent binocular vision to the front and below the bird's bill so it can focus on its underwater prey. Binocular vision is essential for compensating for the effects of refraction when light enters water from air. The fish looks higher (and bigger) than it is, so the bird needs to be able to figure out where to aim to actually snatch the fish.

Most herons either stand and wait or walk slowly to ambush prey. Some, like the reddish egret, are more active, dashing around with open wings to flush prey. Probably the most exceptional though is the green heron. Some use a piece of bread or a cigarette butt as a piece of bait to attract small fish, then grab them when they come!

Running Water

written by Jim Dean

Some years ago, I was walking through prairie grass alongside a wide river in Idaho to get to a place a mile or so downstream where I hoped to tangle with some big rainbow trout. I was in a hurry because a hatch of pale morning dun mayflies was anticipated—indeed, might already be under way—and I was also hopeful I wouldn't find anyone in my favorite spot. I left the faint trail to take a shortcut nearer the river and within a few minutes I came suddenly upon a swift little chute of water.

JIM DEAN

I could easily have stepped across it, but I stopped. The run flowed only a short distance to the river on my right, while to my left perhaps 30 yards up the slope, I could pinpoint the source of this impressive spring by a swath of taller green grass that lay in a shallow swale. Drawn irresistibly, I followed the run upstream until I reached the spot where the spring burbled with surprising volume out of the hillside, forming a small pool no more than a few inches deep.

"We all have our little obsessions, and one of mine has been an enduring attraction to water, particularly if it's moving."

The water was so clear that you could see every pebble—a shimmering mosaic of multi-colored volcanic gravel laced with glittering shards of obsidian. Dense patches of lime-green watercress grew here and there along the edges of the spring all the way down its rapid course to the river. I thought it was one of the most entrancing microcosms I'd ever been privileged to find—a place surely beloved of water sprites and fairies who might fish there with tiny fly rods for miniature jeweled trout. I sat down, taking care not to disturb anything, and poked my stream thermometer into the current. The spring was 42 degrees on a day when the air temperature was 80 and the nearby river was at least 58. I remembered I had once visited a fancy home that had a glass-floored living room cantilevered over a small spring creek—a feature that I found appealing until I decided that it was also environmentally intrusive. I nibbled a few sprigs of watercress, cupped my hands to take a drink, then headed down the river.

I have not since fished that stretch of river without visiting this spot, and I am always pleased to find it unchanged. I like to imagine the Native Americans and parched settlers that surely drank at this tiny oasis long before any anglers discovered it. When I briefly stashed a couple of beers in its icy water last summer, I felt I somehow owed them all an apology.

Perhaps this makes sense, perhaps not, but we all have our little obsessions, and one of mine has been an enduring attraction to water, particularly if it's moving. I have a happy early memory of playing in rainwater running down a street gutter—damming it up, diverting it, releasing it, launching a curled leaf on the current and imagining that I am on that canoe headed to unknown adventure. To this day, I cannot drive over a bridge without trying to glimpse what's below. Any rivulet will catch my eye, even trickles between mud puddles (which, to me, are the braided tongues of a massive Alaskan delta seen from afar).

Over half a century ago when I was a Boy Scout, I remember looking into a clear woodland spring at Eaton's Ferry (now under Lake Gaston). Water striders skated on a surface dappled in sunlight, and crawdads and salamanders hunted along the bottom and in the modest outflow below. I might have sat there entranced for hours, but a Scout buddy walked up and plunged his egg-encrusted mess kit into the spring and began scrubbing furiously. Our Scoutmaster enriched our language when he found our befouled drinking supply.

I have more of these memories than I can count; among them the thrill of fishing up a limestone creek in Pennsylvania until I reached a big circular spring where the creek boiled full-blown out of the ground. The north fork of the Snake River in Idaho wells up from massive springs so clear that the trout there seem encapsulated in molten glass. Fishing any part of that river downstream is enhanced by the awareness of its pristine origin. Even murky water has mysterious charm if it's flowing.

I suppose you could say that I have had no choice since birth but to go with the flow (and even then, come to think of it). I am also convinced that this enduring fixation lies at the core of my obsession with fishing. What other career options—except possibly Army engineer or plumber—did I have?

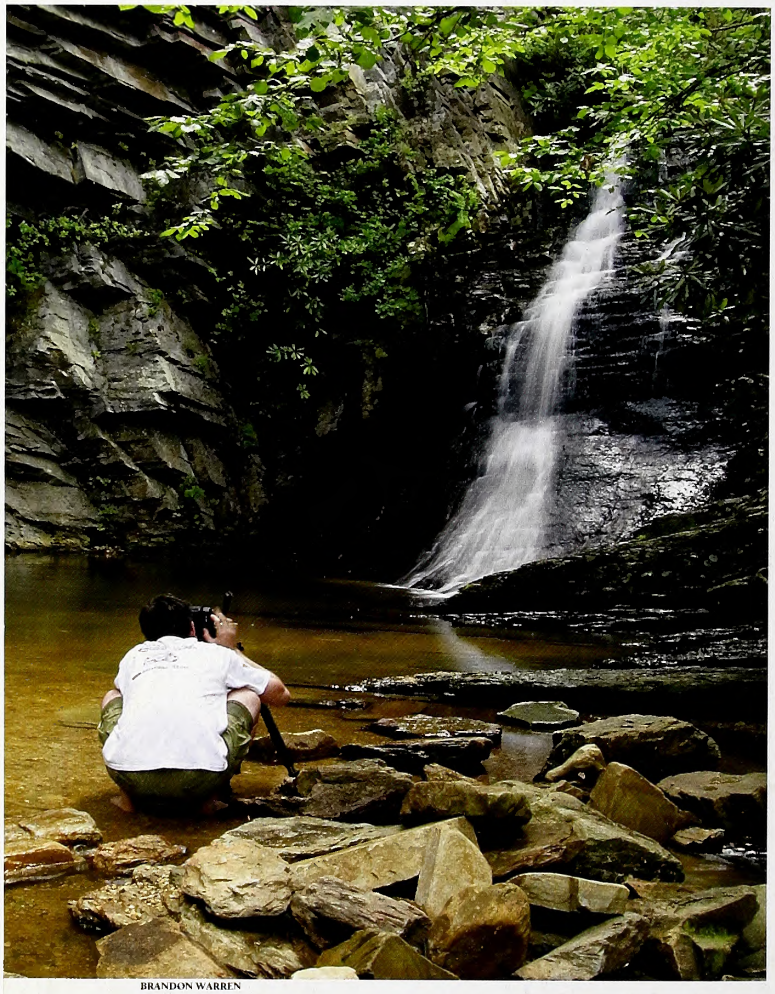
When I still had my tiny primitive mountain cabin in Edgemont, water was piped from a spring directly into the kitchen. Occasionally, I would turn on the tap and a scrawny young spring lizard would appear in the sink, looking a bit confused. Returning it to its home in the fern-shaded run behind the cabin was always an act of mutual gratification.

JAMIE KANOARSKI DAVIDSON

OUTDOOR MOMENT

Monarch caterpillar

IN THE JUNE ISSUE



BRANDON WARREN

WILD IMAGES
Check out the rules and take part in our fifth annual photo competition, which opens June 1.

BOGGED DOWN
Wetland plants are the foundation for North Carolina's incredible diversity of moist-soil habitats.

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What are the ecological ramifications of drilling for oil and gas off of North Carolina's coast?

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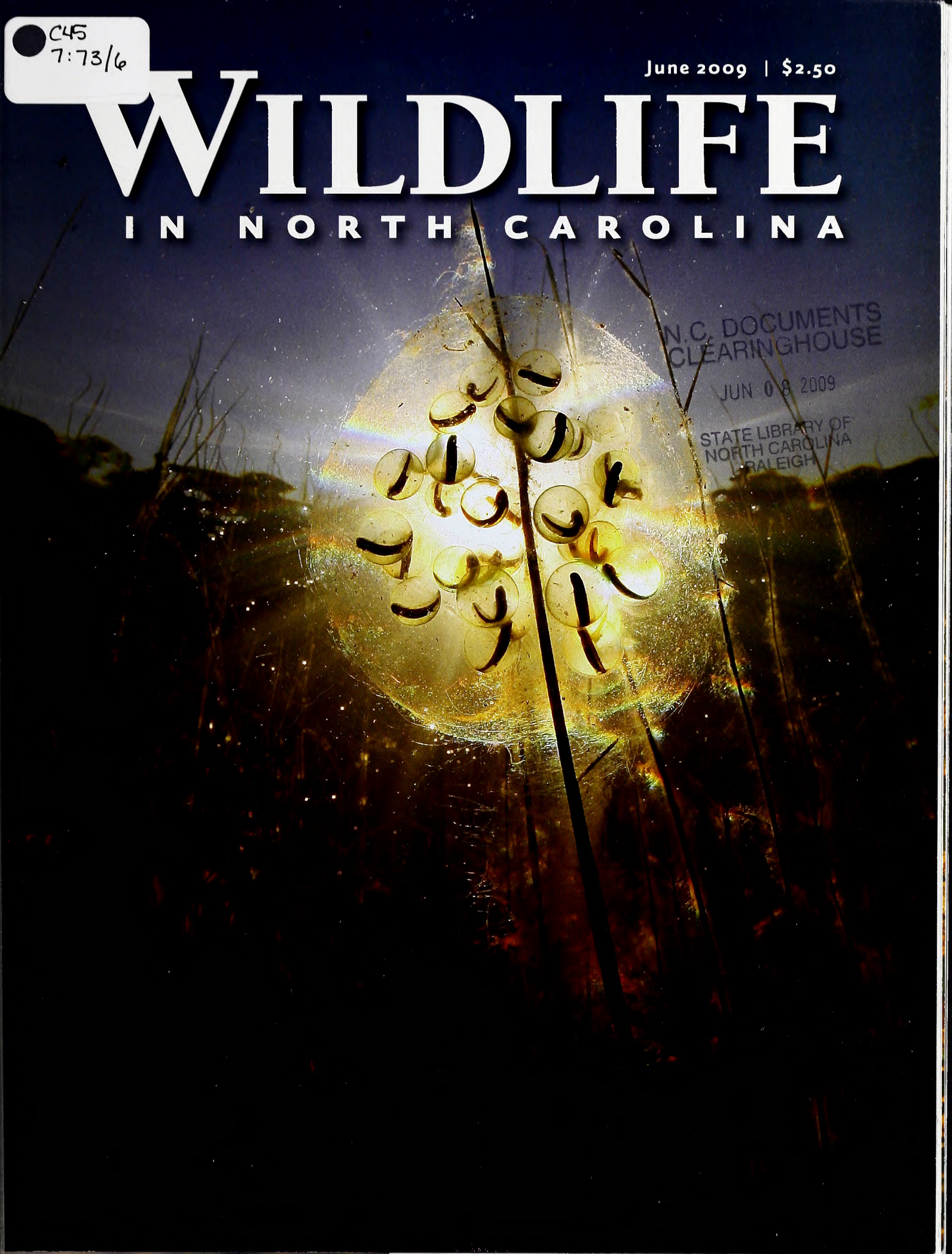

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RALEIGH

To capture outstanding images of birds in flight, such as this pair of black skimmers doing what they do best, one needs to know a few basics of avian photography.

PHOTOGRAPH BY JARED LLOYD.

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Cover: Wetland plants are the infrastructure on which all aquatic animal life relies. This cutgrass provides a secure place for these tiger salamander eggs to develop. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Some outdoors enthusiasts will not be amused that we are publishing a story about fishing for common carp this month ("So Happy Carp," page 10). Let's call those folks fishing purists. We will define them as anyone who considers the common carp to be a "trash fish"—an undesirable species not worth pursuing in any fashion.

ERIC ENGBRETSON

The antithesis of the purist is the fishing pragmatist. These anglers reject the concept of trash fish and are willing to toss a lure or fly at anything that swims and will put up a good fight. In general, fishing purists are after something good to eat or perhaps just a taste of angling tradition. Fishing pragmatists are catch-and-release devotees who are looking for any new, fun fishing challenge.

It's no surprise that Capt. Paul Rose, a pragmatic Gastonia carp-fishing guide with experience pursuing bonefish in warm, salty waters, made the connection between an undesirable fish in Lake Norman and a game fish anglers travel thousands of miles to chase. He even named his guide service Carolina Bonefishing. Carp and bonefish (and even red drum) feed in a similar manner, and the tactics for sight-fishing for each species in shallow water are almost identical.

For the purist who can't wrap his mind around pursuing carp but would spend big money on a trip to the Bahamas or Belize to chase bonefish, Rose recommends practicing on carp as a cost-effective way of honing fishing skills. He says that two or three carp trips will get a fly-angler comfortable with the techniques necessary to catch wary fish, whether the fish swim near Huntersville or Key West.

Rose says that common carp, which average 4–10 pounds in Lake Norman but occasionally grow as large as 15 pounds, are the biggest fish most people will catch in fresh water on a fly. Accomplished mountain trout anglers may beg to differ, but Rose wonders what more a fly-angler could want than backyard availability, a chance to learn and practice saltwater skills, and 30 or more shots a day at a big, powerful fish that will bend your rod.

Fishing pragmatists will probably want to run out to Lake Norman or any of the dozens of other North Carolina lakes or ponds that are home to carp. Perhaps after reading about how much fun it is—or what good practice it is for that upcoming saltwater trip—even fishing purists will give carp a chance.

Greg Jenkins

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Take Me Hunting

Bruce Ingram's article "Gobblers for Beginners" (April 2009) was spot-on regarding the unwillingness of experienced hunters to share their sport as a contributing factor to the decline of hunting in our state. My late father saw more than his share of carnage in two wars, and had no interest in hunting or even recreational shooting. Though I learned the fundamentals of rifle marksmanship at an early age thanks to the NRA's excellent programs for youth, I never had a mentor or guide to show me the ropes as a hunter.

During my own 20-plus years of military service, my limited off-duty time and frequent relocations made it difficult to establish roots anywhere long enough to really become part of a community and build lasting friendships. Now, despite being fully retired and living in the same place for 16 years, there remains a dearth of sportsmen willing to share their knowledge. I have friends who hunt deer, wild turkey, waterfowl and upland game birds, but not one is willing to invite me and my 14-year-old son to come along—even just once.

We are Life Members of the NRA, have completed the NCWRC Hunter Safety Course, and have N.C. Lifetime Sportsman licenses. In addition, I am an NRA-certified Rifle and Shotgun Instructor and Range Safety Officer, so I don't think the reticence of friends is based on safety concerns. Unlike my Dad, I taught my son to shoot safely at the age of 8, and bought him his first youth-sized .22 rifle when he turned 9. But with no hunting experience of my own, to whom can I turn for help getting started?

Bruce Ingram is absolutely right—virtually all of the outdoor-oriented publications and television programs are pitched toward the experienced hunter. It's usually the same old thing every time—a guy who's been hunting his whole life bags a trophy whitetail buck, and then gloats about it while gripping and grinning with the show's host. I've never seen entry-level instructional material in the media covering things such as stalking, calling, cartridge or shotshell selection, handling and cleaning game in the field, etc. So why are so many hunters, who are otherwise probably great guys, so selfish when it comes to sharing their knowledge and expertise?

John C. Simpson
Garner

R.I.P. *Harry W. Adams*

The inside cover photo by Mike Marsh in the April issue shows the derelict *Harry W. Adams* at the mouth of the horseshoe section across the Cape Fear River from Eagles Island ("Assembling the Puzzle of Eagles Island"). The *Adams* was docked at Elijah's Restaurant, but sank when the electricity to the pumps keeping it afloat was cut off. But I am at a loss to know where Mike found the beautiful blue water shown in the Cape Fear River.

I am one of a small group of very old duck hunters that from 1949 until about 1989 explored, navigated (at higher tides) and hunted miles of rice field ditches off of Alligator Creek and its tributaries, which run through much of Eagles Island. It is amazing that slave labor over 250 years ago dug those ditches which are, for the most part, quite navigable today. I applaud Mike and his group in their efforts to preserve Eagles Island in its unique and awesome beauty.

George T. Clark Jr.
Wilmington

Eye of the Beholder

While I found Terry Krautwurst's article in April's issue on vultures good reading ("Big, Bald, Beautiful Vultures," Wild Notebook), I take exception to his statement on the tidiness of these scavengers of nature.

He failed to point out that their group roosting in trees at night is accompanied by a great deal of noise (squawking while jockeying for the prime roosting space) prior to their settling down at night.

Additionally, if this area or favorite tree becomes a long-term roost, their nighttime defecation will coat the limbs and trunks of the trees with highly odiferous and offensive-smelling slime, eventually killing the trees. Thankfully, this scene is most often observed deep in wooded areas, but sometimes occurs in close proximity to individual homes or highly populated subdivisions.

Vultures serve well their purpose in nature, but they are not truly as neat and tidy as the author projects them to be.

David Pritchard
Elizabeth City

Bird Connection

I enjoyed "Providing Provisions" in the Feb. 2009 issue. I have just one feeder consisting of a shepherd's staff with a simple sunflower seed feeder hanging on it. The metal pole is just 3/8 inch, yet the squirrels have no problem navigating the pole from the ground up to the feeder. The feeder also provides adequate seed for ground feeders from falling seed.

My feeder attracts cardinals, jays, sparrows and many other small birds. Mourning doves come in large numbers to feed on the ground, as does my favorite mammal, the gray squirrel. Crows show up on a regular basis.

I really enjoyed the article and may expand my little operation as a result. I agree that feeding birds is one of the great joys in life. I compliment the magazine staff on the job you do with graphic design, photography and publishing *Wildlife in North Carolina*.

Ed Casey
Wilmington

write us

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AGAINST THE CURRENT

MELISSA McGAW / NCWRC

The John E. Pechmann Fishing Education Center carries on the legacy of a man who always looked to the future and whose efforts were crucial to the education center's creation.

WRITTEN BY Mike Humphries

MELISSA McGAW / NCWRC

JODIE OWEN / NCWRC

Had it not been for the efforts of a man devoted to conserving fish and wildlife resources and educating youth about those resources, the John E. Pechmann Fishing Education Center likely never would have happened. The story of how the center, which was formerly the Fayetteville Fish Hatchery, became what it is today is a fitting legacy for the man who worked tirelessly to help create it.

Sadly, Pechmann passed away in 2006 at the age of 57 before the facility officially opened. A prominent Fayetteville attorney with a passion for the outdoors, Pechmann was actively involved in this community, having been appointed to the N.C. Wildlife Resources Commission in 1993 and named chairman in 1999. He served four terms in that capacity, using that time not only to further the goals of the commission but also to create what would become the center ultimately named in his honor.

THE LONG VIEW

The story of the center goes back to the 1920s, when the first ponds were dug at the hatchery. Through the decades, the Fayetteville Fish Hatchery dutifully fulfilled its role, until it was superseded by the Watha Hatchery, which was purchased by the state in 1992.

Following the transfer of warm-water fish production to Watha, the Fayetteville Fish Hatchery was taken offline, and the property was used simply as a depot for state-owned equipment. This could have been the end of the story for the hatchery had it not been for both the vision of Pechmann and an event held by the local chapter of Ducks Unlimited.

"A joke might actually be where this all began," says Lee Warren, a longtime friend of Pechmann and a former state chairman of Ducks Unlimited. He tells a story about Greenwings, a segment of Ducks Unlimited focused on youth 17 years old and under.

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John Pechmann's (top) passion for fishing drove his efforts to create a fishing education center. His family (above) continues the tradition through their active involvement. They are (far right) his brother, Greg Pechmann; (second from right) mother, Lillian Pechmann; (far left) sister, Phyllis Maultsby; and (second from left) sister, Anne Mitchell.

"The first year I was chairman, we decided to do a Greenwings event for the kids with bluebird nesting box building, archery, etc. After a year or two, someone suggested we do a fishing event."

The first Greenwings event was held at a local facility with a few ponds. "It was a beautiful place, and we had great fun, but of the 110 kids who attended, not a single one caught a fish!" Warren explained. At the after-event meeting, someone half jokingly said that if they wanted to catch fish, they should have the next event at the old hatchery.

"A light went off in my head at this point," said Warren. Recognizing that this was a pretty good idea, Warren mentioned that he knew Pechmann and would talk to him about it. A quick phone call later, Pechmann said he would bring it up at the next commissioners' meeting in Raleigh. "I got a call from him right after the meeting, and he told me they all thought it was a great idea," Warren said.

A SERIOUS RESPONSE

What had started as an offhand joke turned into a highly successful first event on the hatchery grounds, with 270 kids attending and Pechmann showing up as well. "It was a grand event, and I think it helped John decide to follow through on a desire of his to make the facility an education center designed to get kids involved in fishing," Warren said. "He mentioned to me that this was a great way to show to the commission what this place could do."

Recognizing its potential after the success of the Greenwings events, the commission began to look differently at the former hatchery. In fact, the facility itself began to host its own events. In 1997, the facility hosted the first Cooperative Fish for Fun event for youth anglers, setting the trend for the future of the place.

However, there was something looming at the time that threatened to derail the whole promise of the facility. Around 2000, there were rumblings about a plan to build a bypass around Fayetteville that would ultimately plow right through the property on which the hatchery was situated.

Once again, Pechmann stepped in and played a significant role. He put in a call to the state secretary of transportation to see if there were any alternatives. After a bit of discussion, the Department of Transportation altered its plans in recognition of the importance of the facility.

BEHIND THE SCENES

"Mr. Pechmann was a facilitator. He made sure that the right people were brought together, and then he would step back and let it happen," states Kris Smith, director of the John E. Pechmann Fishing Education Center.

Having really begun to focus on a concrete plan for the future of the facility as an education center around 2001–2002, Pechmann started getting the proper people involved in the process. "He really helped create the original partnerships that made things happen," Smith stated.

Through a combined effort of the Wildlife Commission, Ducks Unlimited, Fayetteville-Cumberland Parks and Recreation, and local government, Pechmann got all the right folks on board to get the project rolling. Over the course of the next few years, details were hammered out as to what exactly the facility would become. During 2002–2003, the official decision was made to turn it into an education center.

After that point, the process dealt with what the facility would be like. Pechmann had expressed some interest in there being a building overlooking the ponds, and this was incorporated into the design.

In 2005, the commission voted unanimously to name the facility after him. "He was both honored and humbled by having his name put on the facility," says Warren. "He did not like so much fuss being made over him, but he appreciated the gesture very much. He would want everyone to know that it was not about him, but about teaching people about our outdoor resources."

Ultimately, the facility was approved in 2006 with a budget of $1.2 million, and construction began shortly thereafter, taking about one year from start to finish. The facility officially opened in November 2007.

CARRYING ON

Although John Pechmann was unable to see the finished facility, his family has filled in for him every step of the way. "Since his passing in 2006, the family has been involved in every element of the center, from its dedication to the events we hold," says Smith. In fact, Smith held a private event for the family in the facility before its opening.

"Every time I go out there, I feel comfort. I can feel his presence around me when I am there," says Amy Pechmann, John's widow. "He would be so honored by this center that is named after him." She says that she is in contact with Smith so often about the center that he has practically become part of their family.

And the family is very happy with how the center has developed in regard to John's vision. "Would he be happy with what the center has become? Absolutely, without a doubt," states Greg Pechmann, John's brother. His sister, Anne Mitchell, agrees: "It is everything John would have wanted it to be."

FULFILLMENT OF THE VISION

Situated on about 40 acres of land with 10 fishing ponds packed with largemouth bass, channel catfish and a variety of sunfish species, the center is a wonderful resource for fishing enthusiasts both young and old.

The building itself, overlooking the ponds, is an impressive facility constructed of timber, steel and stone. Measuring in at around 4,200 square feet, the center has an airy design with vaulted ceilings and large, open rooms.

In the main entryway in the central foyer of the facility is a selection of interactive learning exhibits. Upon entering the foyer, a visitor encounters the exhibit "Tools of the Trade—Fishing 101." It features representations of various lures and baits that anglers would use to bring in their favorite catch, with an interactive quiz that asks which ones are best for particular types of fish. It also has three reel simulators designed to replicate the weight of 2-pound, 10-pound and 20-pound fish.

The second exhibit, titled "The Watershed Connection," is an interactive exhibit that combines a map of North Carolina with electronic graphics of the state's 17 river basins and the various fish that inhabit them. Visitors can select a species of fish from a list, and the basins in which it can be caught light up.

Across from these interactive exhibits is "Moments in Time," an underwater diorama that illustrates how our fishing techniques appear to the fish. In the center of the entranceway a large redbreast sunfish display shows the fish in detail and also features a cutaway anatomy section. Smith points out that this exhibit would be particularly appreciated by Pechmann, as this fish was his passion.

WORKING THROUGH

In addition to the exhibits, the facility also features a large classroom that can accommodate up to 100 students. "This classroom is a key element and serves as a jumping-off point for the whole purpose of the facility," says Bob Curry, chief of the Wildlife Commission's Division of Inland Fisheries. "This facility is all about teaching kids about fishing and the outdoors and then taking them out to the ponds to practice what they learned, exactly as John envisioned. We provide them with the tools and the opportunity."

In fact, he pointed out that the John E. Pechmann Fishing Education Center has just about everything needed to accomplish these goals—except staff. "We provide the facility and everything budding anglers need, including bait. But we could not provide these

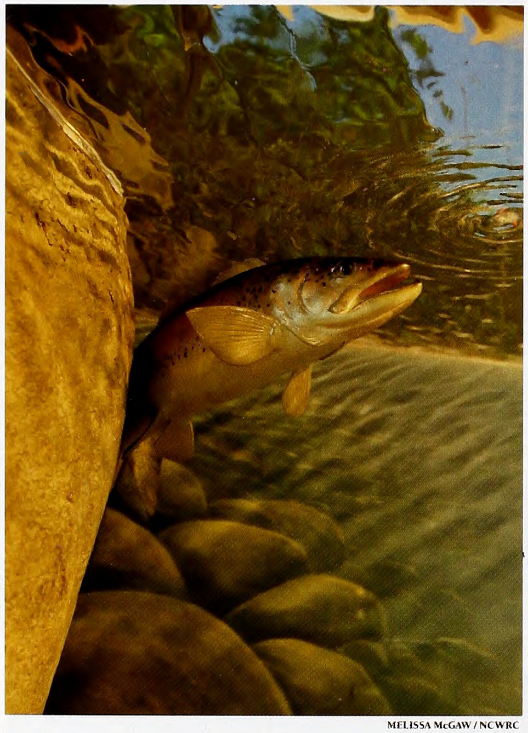
Events held at the center range from the Wounded Warriors program (below) to large events open to the public (bottom).

JODIE OWEN / NCWRC

JODIE OWEN / NCWRC

MELISSA McGAW / NCWRC

JODIE OWEN / NCWRC



MELISSA McGAW / NCWRC

The building overlooking the ponds of the fishing education center is home to several learning exhibits as well as a large classroom. One of the exhibits (top) features representations of lures and baits as well as reel simulators, while another (above) features an underwater diorama.

opportunities without the hard work of all our dedicated volunteers," he continued.

Al Kittredge, one of the facility's regular volunteers, is a perfect example. Having worked with the fly-fishing program for seven years, he has been around for a large part of the development of the education center. And, having taken on the role of volunteer coordinator, Al knows how things are run there. "I am blessed to have a cadre of volunteers that I have assembled over the years who make me look good," Al says. "Without the volunteers, the programs here would not be possible."

Smith agrees, stating that "the Pechmann center is a lean-running operation. With such a small staff, we really rely on our volunteers." Small offices for the director and his staff are located on the opposite side of the building from the classroom.

Once you step out of the building, you look down on ponds totaling 6 acres, with lots of area for anglers to cast a line into the water. One of the larger ponds features a universally accessible fishing deck that accommodates wheelchair-bound fishermen.

REACHING OUT

Combining the efforts of the small staff and a host of motivated volunteers, the center in the last year has put on 59 events attended by more than 7,000 people. Of those, more than 4,000 were children. The activities held at the center fall into three main categories — public, school and specialized events.

The public events are just that — events for which the facility is opened to the public. These popular events can draw large numbers of people to the center. Held most often on Saturdays, these include family-oriented events such as the Mother/Child Fishing Day on the Saturday before Mother's Day and the Father/Child Fishing Day on the Saturday before Father's Day.

The Youth Fishing Day is so far the facility's most popular event and focuses on helping kids learn about fishing. This event on the first Saturday in June gives young people an opportunity to really practice the sport. The center provides loaner reels if needed and starter tackle boxes fully stocked with lures and weights.

Quite fittingly, Ducks Unlimited still holds its annual Greenwings event at the center, usually the second Sunday in September. "This is where it started, and I think it is great that the events are still held here," says Warren. And they are huge, with last year's event totaling more than 1,300 participants, 520 of them kids. "This has easily been one of our largest events here," Smith recalls. "There was not an empty spot around the ponds."

Another event that Smith feels is very important is the National Hunting and Fishing Day, held on the fourth Saturday in September. "We had the property all decked out with tents filled with wildlife and learning exhibits for kids. This event proved to be a great opportunity for us to focus on what the commission does," says Smith. Kids were given a "passport" to take with them from tent to tent that had a list of questions they needed to get answered. "This really got them involved and asking questions," Smith continues. "It was a huge success, and I think next year's will be even bigger."

A SHARPER FOCUS

In addition to the public events, the center also hosts school groups. A natural fit for the education center, these school group visits allow teachers to plan field trips for their kids that teach them the ins and outs of aquatic

habitats, fish biology and anatomy, and conservation. Also of note is the fact that all the classes at the center meet standard school curriculum requirements. After some classroom time learning the basics of fishing, the kids are given the chance to go down to the ponds and give it a try, with equipment and bait provided free.

MELISSA McGAW / NCWRC

However, not all the happenings at the Pechmann Center are general-knowledge events. In its specialized events category, the center hosts a wide variety of classes and events, ranging from four fly-fishing clinics held in late winter to Boy Scout events at which youth have the opportunity to earn the fishing and fly-fishing badges and learn how to catch and cook a fish right there. One of the newest specialized events is the Wounded Warriors program, which allows wounded soldiers to take classes on fly-fishing at the facility.

DESERVED LEGACY

Would Pechmann be satisfied with what the center named in his honor has to offer? From people acquainted with him, the answer seems to be a resounding "Yes."

"I think that John would be very pleased; it fulfills his vision for introducing the next generation to fishing and the outdoors," says Inland Fisheries chief Curry.

And this opinion carries through to those who knew him best. "He would be so proud," says Amy Pechmann, holding back tears. "I know that he would be honored and humbled by what it has become. This is exactly what he would have wanted." ◆

Mike Humphries is managing editor of Wildlife in North Carolina *magazine.*

MELISSA McGAW / NCWRC

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VISIT OTHER WILDLIFE EDUCATION CENTERS

The Pechmann Center is the newest of four wildlife education centers operated by the N.C. Wildlife Resources Commission. Visit the other centers to see fascinating exhibits, take part in wildlife-related classes or shop in the Wild Store.

Pisgah Center for Wildlife Education, Brevard
Located along the Davidson River. Features the habitat and wildlife of the Mountain region, plus a trout hatchery.
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(919) 707-0209

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Located in Currituck Heritage Park on Currituck Sound. Features the wildlife, natural history and cultural heritage of the Coastal Plain region.
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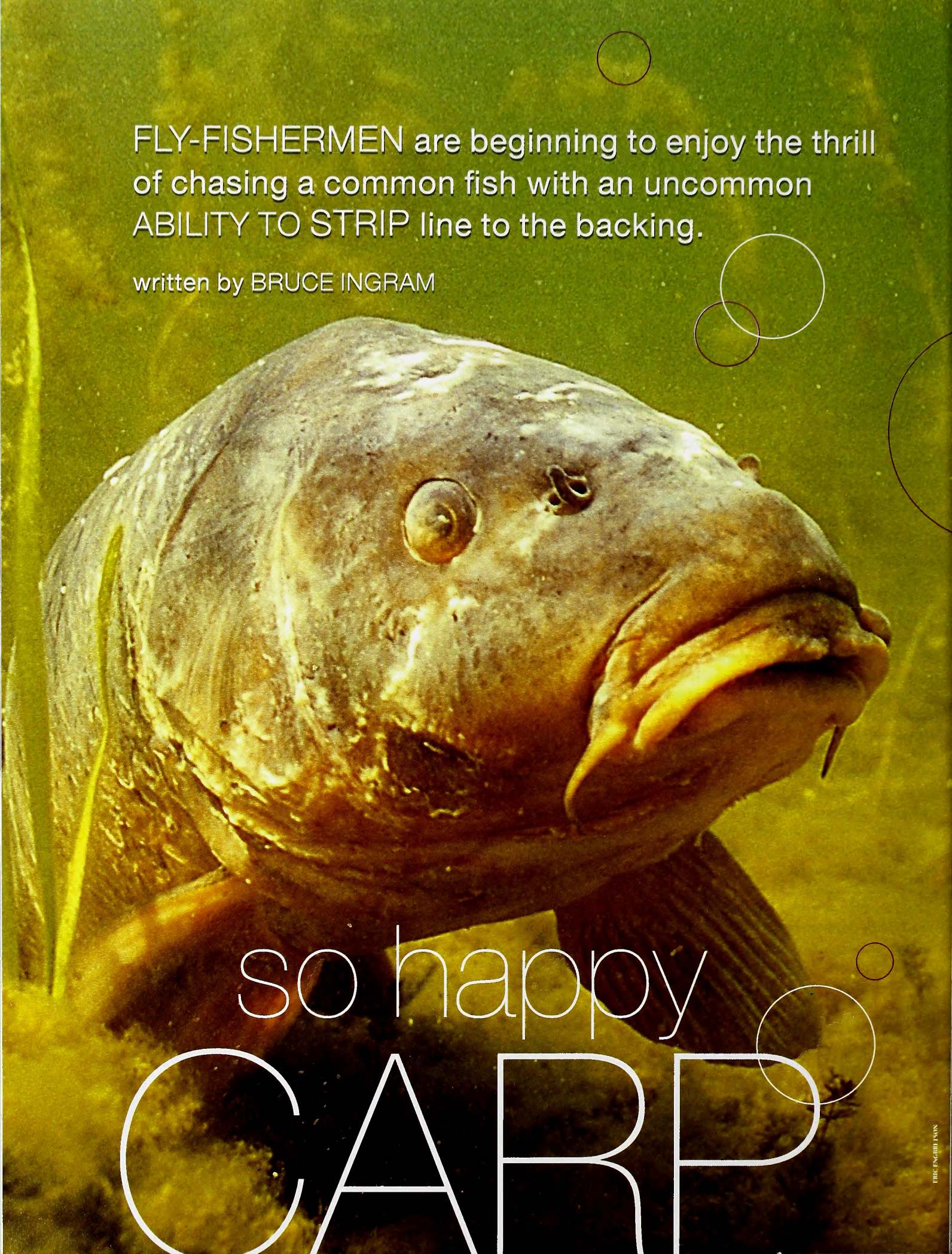
The N.C. Wild Store at each center offers nature-oriented merchandise, including educational materials, books, posters, gifts, artwork and apparel. All proceeds support conservation education projects and programs.

Visit **www.ncwildlife.org** for more information.

FLY-FISHERMEN are beginning to enjoy the thrill of chasing a common fish with an uncommon ABILITY TO STRIP line to the backing.

written by BRUCE INGRAM



so happy CARP

ERIC ENGBRETSON

"There he is … he looks happy," whispers Capt. Paul Rose from the bow of his boat.

"I see him," replies Brad Sturkey in a hushed tone from an elevated platform at the boat's stern. "He's more than happy, he's so happy."

I am standing behind Rose and also spot the fish. It is moving in a straight direction, tail up and head down, and nosing up little puffs of sand and other debris. The time is 12:45 p.m., and we are far back on an isolated Lake Norman cove on a mid-June day, with an air temperature in the low 90s and a water temperature hovering in the mid-80s. For the past two hours, we have not seen anyone else fishing in these sultry conditions.

Earlier, when the three of us were still on the main lake and some hundred yards from the cove, Rose had turned off the boat's engine and employed a trolling motor to power us toward the cove's entrance. By the time we entered the cove, Rose, who runs Carolina Bonefishing from Gastonia, had switched off the trolling motor. Then Sturkey, who assists Rose, began employing a 12-foot pole to slowly ease us into and through the cove.

Our quarry spotted, Rose (who has been holding a Clouser crayfish in the palm of his right hand, fly line lying limp in coils at his feet) slowly initiates a roll cast that sends the Clouser about 2 feet in front of the fish but about 18 inches to the side. For any other species, the cast would have been close to perfect, but the guide grimaces and mutters, "Bad cast."

The fish apparently agrees and continues on its path, totaling ignoring the pattern. Rose then delicately, deliberately picks up the fly and institutes another roll cast. This time, the pattern lands about 18 inches directly in front of the fish. The golden-sided creature slightly flares its prominent orange lips, and the Clouser disappears.

The guide quickly sets the hook, and the fish immediately begins stripping off long sections of line, so much so that the fly reel is soon into the backing. "He's only about 5 pounds," yells Rose. "But, my gosh, these fish can fight!"

Sturkey deftly poles the boat toward the fish while Rose struggles to apply pressure as the fish makes one powerful run after another. Finally, some two minutes later, the fish begins to tire, and Rose leads him toward the left side of the boat. Sturkey comes down from the platform, grabs a grip and then tries to land the fish.

At that motion, the fish streaks away from the boat, and Rose exclaims: "Typical. They always have one last run in them, even when you think they don't." Some 45 seconds elapse before he can again bring the fish to the boat's side, and this time Sturkey is able to land it.

"Carp are really beautiful fish," admires Sturkey. "Look at how those golden sides glisten in the bright sunlight."

A BEAUTIFUL FISH

I can't believe I am so thrilled to see someone catch a common carp. Until recently, I never had an appreciation for the formidable fighting ability of carp and the skill that it takes for fly-fishermen to entice them. Indeed, fly-fishermen have developed their own lexicon for carp (see accompanying sidebar) with such terms as "happy," "so happy" and "do the gondola."

This beginning of my change of heart came at the Charlotte Fly-Fishing Show when I happened upon a seminar given by Rose. My initial response was to regard the whole fly-fishing-for-carp thing as preposterous, but after listening for a few minutes to Rose's presentation, I became intrigued enough to book a trip.

BRUCE INGRAM

Before going to Lake Norman, I contacted Brian McRae, the Piedmont fisheries research coordinator for the N.C. Wildlife Resources Commission. The biologist said that Norman holds plenty of carp, and fishing pressure is light.

"Recent gill net surveys and electrofishing surveys conducted by Duke Energy have found common carp upward of 20 inches long that weighed approximately 8 pounds," says McRae. "I would say that angling pressure directed at carp is very minimal. In a recent 12-month creel survey from September 2006 through August 2007, only .5 percent of all anglers interviewed indicated that they were specifically fishing for carp."

Given their bottom-feeding nature, carp have been known to disrupt the spawning activities of game fish. McRae says that N.C. State University, in conjunction with the Wildlife Commission, is currently conducting a food web study at Lake Norman. This project will help identify many different interactions within and among species.

"Granted, it will be a few more years until that project is finished," McRae says. "I would say that carp feeding and spawning behaviors might disrupt nests or feeding of other fishes at a small or local scale. However, I do not think carp are abundant enough to negatively affect the Lake Norman fishery as a whole."

Carp, says McRae, begin spawning in the spring when water temperatures reach 60 degrees Fahrenheit. So this species begins the reproductive process sooner than fish such as largemouth bass and bluegills. The

CARP GLOSSARY

Bubbles at 11:00: Emissions of a feeding carp, although the direction can vary.

Clooping: The sound made by or the sight of a carp jumping or wallowing on the surface.

Do the gondola: To pole slowly toward a feeding carp.

Happy: A contentedly feeding carp.

Mud line: Puffs of debris caused by a feeding carp.

Shot: A chance to catch a carp, specifically a perfect cast to a so happy fish. A 10-shot day is considered good.

Sleeper: A suspended carp that is not feeding.

So happy: A contentedly feeding carp moving in a well-defined direction.

Tailing fish: A feeding carp with tail visible in shallow water.

Trash fish: An inside joke among carp anglers. Refers to bass, bluegills, crappies and other game fish that take a fly when these anglers are after carp.

biologist also was intrigued about fly-fishing for carp. "Good luck fly-fishing. I bet you are in for quite an experience," he said. "I imagine carp put up quite a fight on a fly rod."

Indeed they do. What inspired Paul Rose, who has been chasing carp since 2000 and guiding for them since 2003, to begin fly-fishing for them?

"My angling roots are in saltwater, especially sight-fishing for such species as redfish and bonefish," he says. "The similarities of sight-fishing for bonefish and carp are what inspired me to come up with the name of my guide business, Carolina Bonefishing.

"Fly-fishing for carp is very seasonal, lasting only from May through October in much of North Carolina. During that time period, carp feed just like bonefish. Both species feed with their heads down and tails up, creating a mud line. You track the fish by following those mud lines." Rose said that as a carp forages along the bottom, it also emits "little subtle bubbles" that further help an angler to follow its path.

CASTING'S THE KEY

"Carp have only a dinner-plate-size sphere in front of them where they are looking to feed," says the guide. "If you miss that little plate, then they won't pick up the fly. They don't feed like a smallmouth, for example, by ambushing prey or darting after it. Carp have tunnel vision; they never turn on a fly like a smallmouth does. When they come to a fly, they either suck it up or not—like bonefish."

Once the fly-fisherman ascertains a carp's path by noting the direction of the mud lines and air bubbles, he should slow his boat, make a quiet and stealthy approach, and then cast ahead of the fish, so that the fly has descended to the right depth by the time the carp arrives. Not that a fly has far to fall.

Rose said that the fish will feed in water as shallow as 6 inches and often are in depths of less than 2 feet. Interestingly, carp, just like bass, forage along rocky points, although the former species is much more likely to be in the shallows when the water is warm. Unlike bass, carp will sometimes convene in large numbers on sand and muck points. And, fascinatingly, carp typically forage on many of the same prey species that black bass do. Rose says that some of his favorite fly patterns imitate such preferred forage as damselflies, dragonflies, mayflies and crayfish.

"You can often see a carp suck in a fly," marvels Rose. "Put the fly in front of the fish, let it sink, and then twitch it just a little when he comes up to it. You'll see those lips projecting outward and maybe even the fly disappear. Don't get anxious and set the hook too soon, though. That's a mistake many people make.

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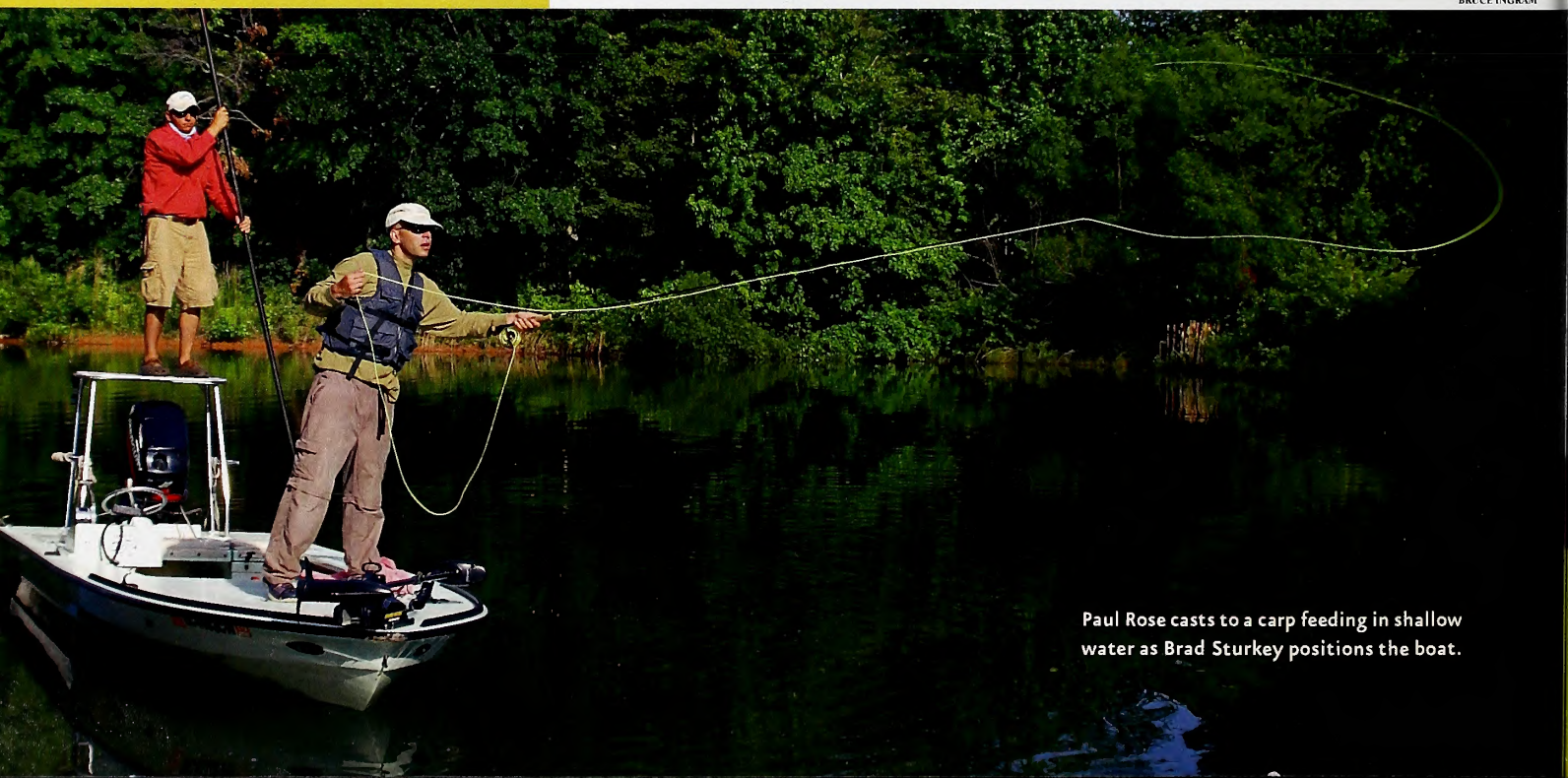

Paul Rose casts to a carp feeding in shallow water as Brad Sturkey positions the boat.

"CARP HAVE ONLY A DINNER-PLATE-SIZE SPHERE IN FRONT OF THEM WHERE THEY ARE LOOKING TO FEED. IF YOU MISS THAT LITTLE PLATE, THEN THEY WON'T PICK UP THE FLY."

– Paul Rose

"Because if you spook a carp, it won't come back for a fly. They are exceptionally wary, and you might not understand how much so unless you have sight-fished for bonefish or other game fish," he says. "Their body language changes when they become alarmed. They may still swim in front of you, but they will stop tailing, and that mud line disappears."

BRUCE INGRAM

Rose also says that anglers should not blind-cast, because the odds are astronomical that carp will be in front of where a randomly tossed fly lands. Also, a fly that lands on a fish will surely spook it.

"As you near a carp, prepare to cast as you or your buddy slowly uses a pole to come close," says Rose. "As long as the fish is happy, he will strike. But if his body language changes and he stops mudding, the odds of having a hookup go way down. Anything can spook him: a boat wake, the shadow of a false cast, a fly landing on the fish."

Anglers have to be concerned with a carp's acute senses. Like bass, for example, this species has a lateral line, but carp also have a type of hearing called the Weberian apparatus, Rose explains. Basically, this is a term for small bones that connect the carp's swim bladder with its auditory system. Carp can even hear us talk, which explains why Rose and Sturkey told me that we could converse only with whispers. It's no wonder that carp cease to be happy when an angler pads across a boat or carelessly lays down tackle.

Carp will feed under low light conditions, and mornings and evenings are excellent times to go after them in the summer. But as our outing proved, these fish often forage actively during the middle of the day. Rose said that carp will feed well until the water temperature soars over 90 degrees.

After Rose caught his carp, he asked if I wanted to try fly-fishing for them for a while. I enthusiastically assented, and Sturkey poled around the cove looking for a tailing carp, but none were to be found.

"I'm not surprised by the lack of activity," Rose told me. "If you catch one, every other carp in a cove seems to disappear. It's almost as if the fish caught gives off some scent that alarms every other fish in the area. Carp are amazing fish."

Indeed they are, and after I leave Lake Norman, I make a mental note of the desire to do some more Carolina bonefishing in the future. ◆

Bruce Ingram has written four books on river fishing, among them the "New River Guide" and his latest, "Fly and Spin Fishing for River Smallmouths." To purchase a copy, contact him at be_ingram@juno.com.

NATURE'S WAYS

How Do Carp Feed?

See Nature's Ways, page 39.

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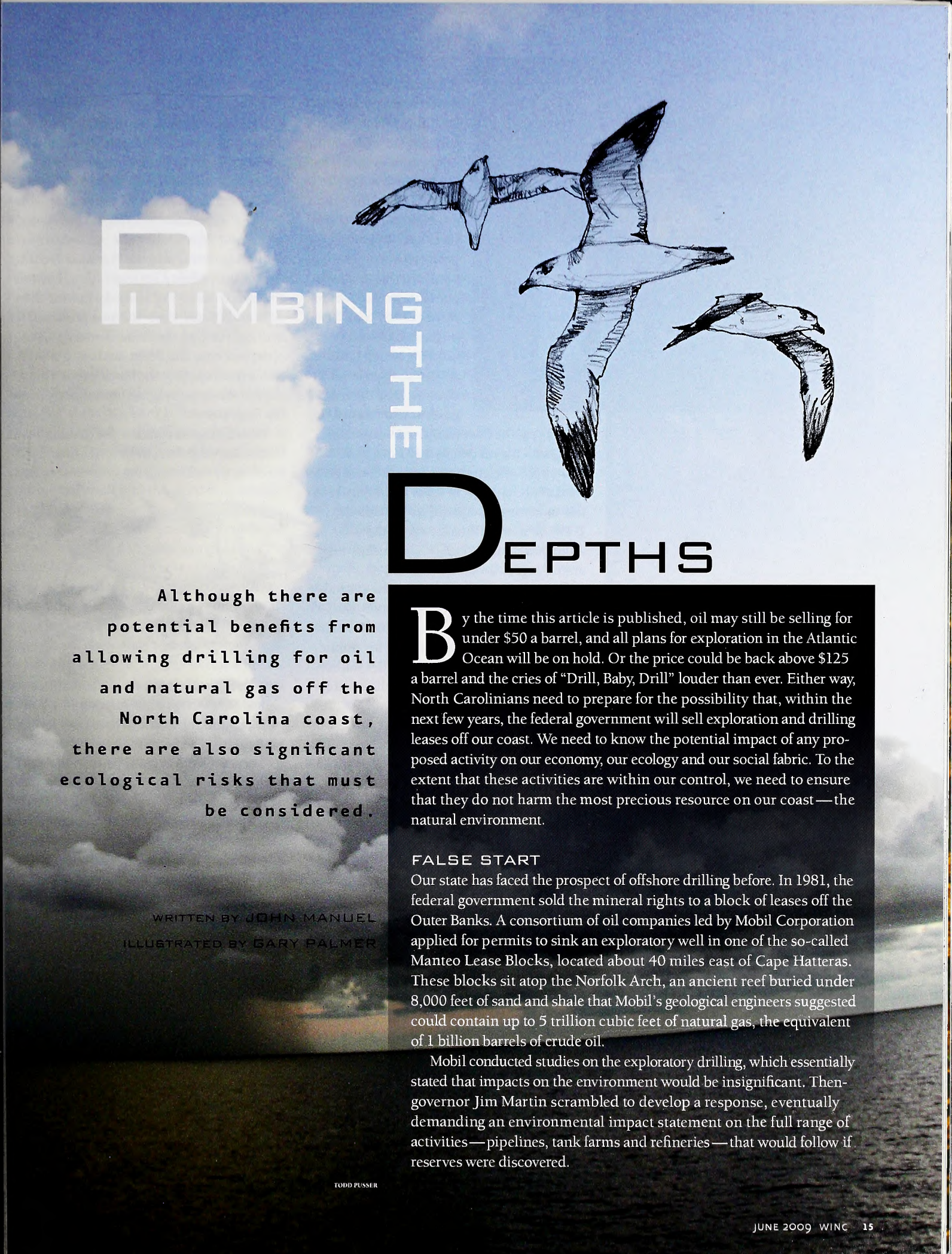


PLUMBING THE DEPTHS

Although there are potential benefits from allowing drilling for oil and natural gas off the North Carolina coast, there are also significant ecological risks that must be considered.

WRITTEN BY JOHN MANUEL
ILLUSTRATED BY GARY PALMER

By the time this article is published, oil may still be selling for under $50 a barrel, and all plans for exploration in the Atlantic Ocean will be on hold. Or the price could be back above $125 a barrel and the cries of "Drill, Baby, Drill" louder than ever. Either way, North Carolinians need to prepare for the possibility that, within the next few years, the federal government will sell exploration and drilling leases off our coast. We need to know the potential impact of any proposed activity on our economy, our ecology and our social fabric. To the extent that these activities are within our control, we need to ensure that they do not harm the most precious resource on our coast—the natural environment.

FALSE START

Our state has faced the prospect of offshore drilling before. In 1981, the federal government sold the mineral rights to a block of leases off the Outer Banks. A consortium of oil companies led by Mobil Corporation applied for permits to sink an exploratory well in one of the so-called Manteo Lease Blocks, located about 40 miles east of Cape Hatteras. These blocks sit atop the Norfolk Arch, an ancient reef buried under 8,000 feet of sand and shale that Mobil's geological engineers suggested could contain up to 5 trillion cubic feet of natural gas, the equivalent of 1 billion barrels of crude oil.

Mobil conducted studies on the exploratory drilling, which essentially stated that impacts on the environment would be insignificant. Then-governor Jim Martin scrambled to develop a response, eventually demanding an environmental impact statement on the full range of activities—pipelines, tank farms and refineries—that would follow if reserves were discovered.

TODD PUSSER

HILARY MERCER

NORTH CAROLINIANS NEED TO PREPARE for the possibility that, within the next few years, the federal government will sell exploration and drilling leases off our coast.

The state filed a legal action against Mobil for lack of consistency with the federal Coastal Zone Management Act. The U.S. Department of Commerce upheld the state's decision in 1994. Three years later, Chevron Corporation announced plans to drill in a separate lease block. Chevron subsequently transferred its lease blocks to Conoco, which failed to act on filing an application. In 2000 the federal government banned drilling on the East Coast and eventually paid back the oil companys' lease fees.

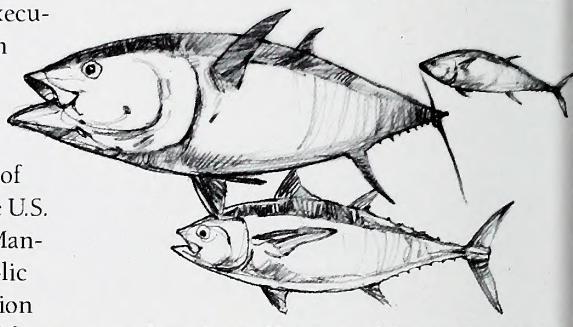
In 2008, the prospect of drilling arose anew when Pres. George W. Bush lifted the executive moratorium, enacted by his father in 1990, on new drilling for oil on the outer continental shelf (OCS). A separate congressional moratorium on drilling on the OCS expired at the start of fiscal year 2009. In November 2008, the U.S. Department of the Interior's Minerals Management Service (MMS) called for public comment on the opening up of 2.9 million acres of waters to a lease sale scheduled for 2011. That area includes waters off Virginia but not North Carolina. However, MMS officials state that a second lease sale, possibly including tracts off North Carolina, could take place as early as July 2010.

TEEMING WITH LIFE

Geologists are intrigued with the region off North Carolina for what might lie below the sea floor. Oceanographers and biologists are interested in what lies above it. Here, in an area off Cape Hatteras known as the Point, two major ocean currents converge: the warm, north-flowing Gulf Stream and the cool, south-flowing Labrador Current. Mobil's study describes it as follows: "The drill site is located in a zone of rapid transition from the South Atlantic Bight to the Middle Atlantic Bight. . . . The Hatteras Corner is a complex, ever-changing oceanographic environment."

This collision of currents creates a tremendous upwelling of phytoplankton and zooplankton. That attracts fish, marine mammals, seabirds and sea turtles of all species and sizes. David Lee is a seabird specialist with 30 years' experience working for groups such as the Audubon Society, the N.C. Museum of Natural Sciences and the National Oceanic and Atmospheric Administration. Lee has conducted surveys of seabirds, marine mammals and sea turtles in the area proposed for drilling. Among the many seabirds Lee observed near the Point are four globally endangered species: the black-capped petrel, the Bermuda petrel, the herald petrel and the Fea's petrel.

Ornithologists estimate the population of black-capped petrels to be fewer than 2,000 breeding pairs. Though the species is regularly



seen along the Gulf Stream of the southeastern United States, large concentrations are known only around the Point, where they forage year-round. The Bermuda petrel is one of the most endangered avian species in the world, with little more than 50 adult breeding pairs. The only available at-sea records of this petrel in U.S. waters are from North Carolina in the vicinity of the Point. The roseate tern, listed as endangered in the United States, is also common in the area.

Mobil's DEIS lists 31 species of marine mammals that utilize the waters near the proposed drill site at various times of the year. These include federally endangered fin whales, humpback whales and sperm whales. Sea turtles, including the endangered leatherback and Kemp's ridley, and the threatened loggerhead, are known to inhabit the offshore

environment. Young loggerheads and Kemp's ridleys are commonly observed in the sargassum weed drift lines at the edge of the Gulf Stream, where they feed on surface biota.

The area around the Point is famous for recreational fishing, drawing people from across the state and the nation. Species in the epipelagic zone (depths up to 600 feet) include marlin, swordfish, dolphin, tuna, wahoo and king mackerel. These are the lifeblood of North Carolina's charter/headboat fishing industry, which generates more than $100 million in annual spending and income, according to a 2009 study by North Carolina SeaGrant.

Although life at or near the surface of the Point is well known to sportsmen and scientists, life at the sea floor is less so. Mobil's proposed exploratory drill site was located at a depth of 2,690 feet on the outer continental slope, a transition zone between the shallow continental shelf and the deep floor of the Atlantic Ocean.

To assess the environment, a number of scientists surveyed the area using manned submersibles and other gear. A team led by Steve W. Ross of UNC Wilmington researched the benthic and water column fishes, revealing abundant wolf eelpouts, witch flounders, hagfish, sea anemones and brittle stars scattered along a rugged, muddy bottom. Ross's team has just published a study on the fishes that use Sargassum and open-water habitats in this area, revealing that up to 80 fish species use Sargassum as juveniles. Overall, scientists discovered that this was one of the most productive deep-sea bottoms along the U.S. upper continental slope.

In order to compare the Point area to other habitats, Ross' team moved their studies further south (off Cape Lookout down to Cape Canaveral, Fla.). Their research from 2000 to the present has revealed the presence of deep coral reefs and a wide assortment of fishes, many of them new to science. Ross's group has reported 99 species of fishes using deep-sea coral habitats, more than known anywhere else in the world.

Should drilling for oil or natural gas occur off the OCS, the product will have to be delivered to shore, stored and refined before being transported to market. Therefore, one should consider the possibility that the Outer Banks and the soundside shorelines would be crossed by pipelines and their natural environments impacted to some degree.

The Outer Banks are treasured by people near and far as a vacation spot and by many others for their livelihood. More than a million people visit the Outer Banks every year to bask on the pristine beaches and to sail, fish, hunt and birdwatch. Virtually every species of migratory waterfowl known to the eastern United States passes through the banks at some time of year. Striped bass, flounder, speckled trout, bluefish, false albacore, red drum and Spanish mackerel cruise the near shore and the sounds.

The coastal marshes are breeding grounds for finfish and permanent homes for crabs, shrimp, oysters and clams. Herons, egrets and rails feed on the fish and crabs, as do eagles and ospreys. Each gradation of marsh—tidal, low saltwater, high saltwater, brackish and freshwater—has its own suite of plants and animals. Any permanent intrusion of saltwater, say from a pipeline or canal, would alter the vegetation and the animals that depend on it.

EXPLORING EXPLORATION

What would an offshore oil and gas drilling operation look like, and what might its impact be on the ecology of the North Carolina coast? Because there are no active leases off the state's coast, one can only speculate on the location, size and structure of such an operation. However, by looking at the DEIS prepared by Mobil in 1989, and consulting with experts in modern drilling technology, it is possible to paint a broad picture.

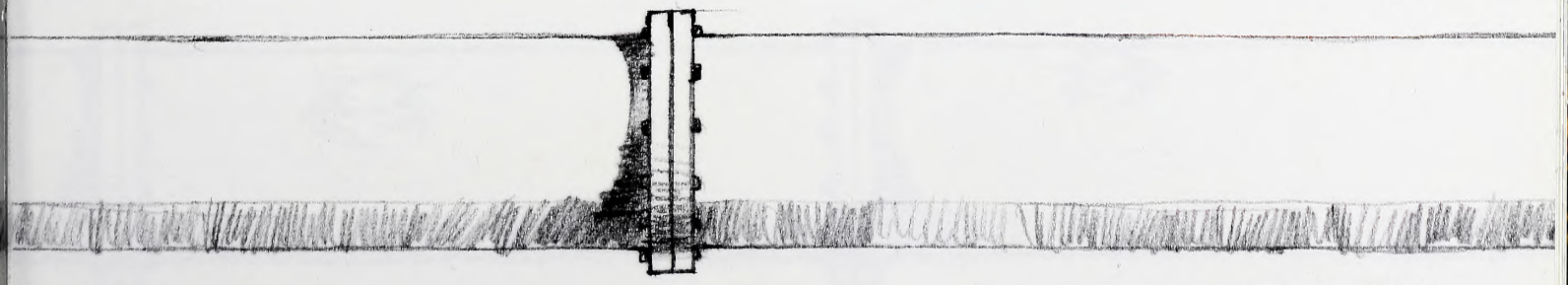
Mobil stated in its DEIS that there was a 10 percent chance of hydrocarbon discovery in the Manteo area. Within that 10 percent, the company felt there was a 90 percent chance that the discovery would be natural gas. Lincoln Pratson, associate professor of sedimentary geology at Duke University's Nicholas School of the Environment, says that no one really has any idea how much

FIN WHALES
TODD PUSSER

DOLPHINFISH
TODD PUSSER

HUMPBACK WHALE
TODD PUSSER

BRITTLE STAR
ART HOWARD



MELISSA McGAW / NCWRC

OYSTER

MASLOWSKI PRODUCTIONS

GREAT EGRET

MIKE DUNN

LOGGERHEAD SEA TURTLE

oil and gas lies off the Atlantic coast. "But if all they find is natural gas, chances are it will not be developed," Pratson says. "There are huge new finds of natural gas on the U.S. mainland that will meet our needs for some time to come."

Assuming that economically recoverable quantities of hydrocarbons are found offshore at the depth identified by Mobil, drilling would likely take place using a floating platform anchored to the bottom, according to Mike Conner, a geologist with the MMS. Modern drilling operations can involve a dozen or more subsea wells attached to a single platform, so the visible structures on the surface could be few in number.

BALD EAGLE

MELISSA McGAW / NCWRC

Drilling at a depth of around 2,600 feet would involve penetrating the sea floor with a hole roughly 30 inches in diameter. The platform would be anchored to the bottom with chains connected to anchors or cement blocks. Ross says that regulations prohibit drilling or anchoring platforms within 200 feet of a coral reef, so the physical structures would presumably not do any damage to reefs, should any be found in the area.

The drilling process involves the use of "muds," which are used to control subsurface pressures, lubricate the drill bits and carry the cuttings to the surface. Cuttings from the sea floor, which typically retain a fraction of the drilling muds, are dumped over the side of the platform. Process water containing a fraction of oil and grease is also dumped over the side. Drill cuttings have been shown to be toxic to benthic organisms in lab settings. The chief concern is their impact on bottom species, which could potentially be smothered. Mobil's DEIS states that when disposed of over the side, drill cuttings "disperse within minutes or hours to concentrations much lower than the lethal calculations observed in bioassays."

Assuming the drilling muds, cuttings and process water did no great harm, drilling platforms could actually be a boon to offshore fishing. Rigs provide structure, which attracts all manner of fish. In the Gulf of Mexico, drilling rigs are favored destinations of offshore anglers. There is even an "Offshore Fisherman's Bible" providing the locations of oil and gas rigs from Texas to Louisiana.

But drilling rigs are not without their risks to wildlife. They are brightly illuminated at night, and that could be hazardous, even fatal, to birds at sea. "Birds use lights for orientation, just like moths around a flame," Lee says. "On foggy nights, they could have real trouble, colliding with the towers. It could wipe out species most people have never heard of."

Oil or natural gas produced offshore needs to be transferred to shore for storage and refining. Conner says that, given the seasonally heavy seas and high winds off Hatteras, transport of oil or gas from the wells would most likely need to be done by pipeline rather than by ship. The digging of canals and laying of pipelines in Louisiana did tremendous damage to that state's coastal marshes, destroying nursery areas and allowing the intrusion of saltwater that killed vegetation with a low salt tolerance. North Carolina does not have the extensive coastal marshes that Louisiana has, but it does have some, and that is a cause for concern.

"There is nothing better for offshore fishing than oil rigs, and nothing worse for marshes than pipelines and canals," says Charlie Smith, executive director of Louisiana's Charter Boat Association.

North Carolina's Coastal Area Management Act (CAMA) could actually prevent the laying of pipelines (or any other structures) within 3 miles of the coast or crossing onto land. Currently, CAMA rules prohibit any development seaward of the front line of dune vegetation. "It's a rule rather than a law, so exceptions could be allowed by the [Coastal Resources] Commission," says Jim Gregson, director of the N.C. Division of Coastal Management. In addition to conforming to state regulations, any plans to lay pipelines across the Outer Banks between

Hatteras Inlet and Duck would have to comply with Dare County's land use plan, which currently prohibits such structures.

Clark Wright Jr. is a New Bern lawyer who served as Gov. Martin's advisor on dealing with Mobil Oil in the 1980s. Wright thinks that, given North Carolina's extensive regulatory framework, the likely political opposition and the total lack of oil or gas infrastructure (pipelines and refineries) in the eastern part of the state, any company drilling for oil offshore is more likely to run pipelines to Norfolk, Va. "The Manteo Blocks are actually closer to Norfolk than to Morehead City," Wright says. "They already have industrial facilities up there, and no barrier islands to contend with."

Locating pipelines and storage facilities in Norfolk would avoid much, but not all, of the potentially negative impact of oil and gas development off our coast. There would still be some risk of blowouts and leaks at the wells. Technology to prevent such occurrences has improved greatly over the past few decades. All offshore wells now have storm chokes that detect damage to surface valves and shut off the wells in emergencies. Blowout preventers are installed beneath the sea floor. Sensors continuously monitor the subsurface and subsea bed conditions to prevent spills in the event of unexpected changes in well pressure.

Still, there were 124 spills totaling 17,652 barrels of oil from drilling rigs and platforms in the Gulf during Hurricanes Katrina and Rita. According to the MMS, none of that oil washed onshore, and there was no evidence of oiled birds or mammals. Given the location of North Carolina's deposits at the edge of the north-flowing Gulf Stream, Lee says any oil leaked from offshore wells "is more likely to end up in Scotland than on our beaches." But that doesn't mean a spill would do no harm.

"There are all sorts of divergent currents out there," Lee says. "Everything that feeds near the surface gathers near the edge of the currents. From an ecological perspective, you couldn't come up with a worse place to drill."

CAREFUL CONSIDERATION

Whether and how we reduce our dependence on foreign oil may well be the central national, economic and environmental security question of the next decade. There is no question that if we hope to achieve this security, new oil and natural gas reserves will have to be tapped. Alternative sources of energy may eventually replace many of these traditional fuels, but not all, and not anytime soon.

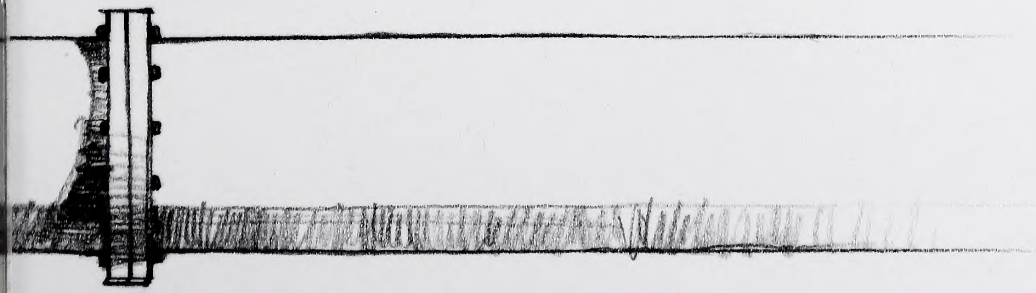
At the same time, North Carolinians should realize that, under current law, we would have no control of and receive no royalties from oil produced off our coast. (Former governor Mike Easley lobbied Congress for legislation to allow states to purchase lease permits for their offshore oil reserves, but as of this writing, this had not been approved.) North Carolina oil would enter the world market, where its impact on domestic supply and prices would be infinitesimal. And that impact would be well into the future. The earliest date that production could begin would be about 14 years from now.

That is not to say that we should not plan for the future or should entirely discount our potential contribution. Every little bit counts, as the saying goes. Critics are right to say we are eager to enjoy the benefits of the product while relying on others to host the ecological burden. All oil and gas comes from someone's back yard.

But we should realize that our back yard—the Point, in particular—is unique in this country. It is an ecological wellspring that supports an incredible diversity of fish, birds and sea mammals, some species of which are on the brink of disappearing from the planet. We have been asked to make sacrifices to ensure our energy independence. Should we not be willing to make sacrifices to ensure the survival of wildlife? ◆

Critics are right to say we are eager to enjoy the benefits of the product while relying on others to host the ecological burden. ALL OIL AND GAS COMES FROM SOMEONE'S BACK YARD.

John Manuel is a regular contributor to WINC *who spent 13 years promoting alternative energy for the N.C. Energy Division and the N.C. Alternative Energy Corporation.*

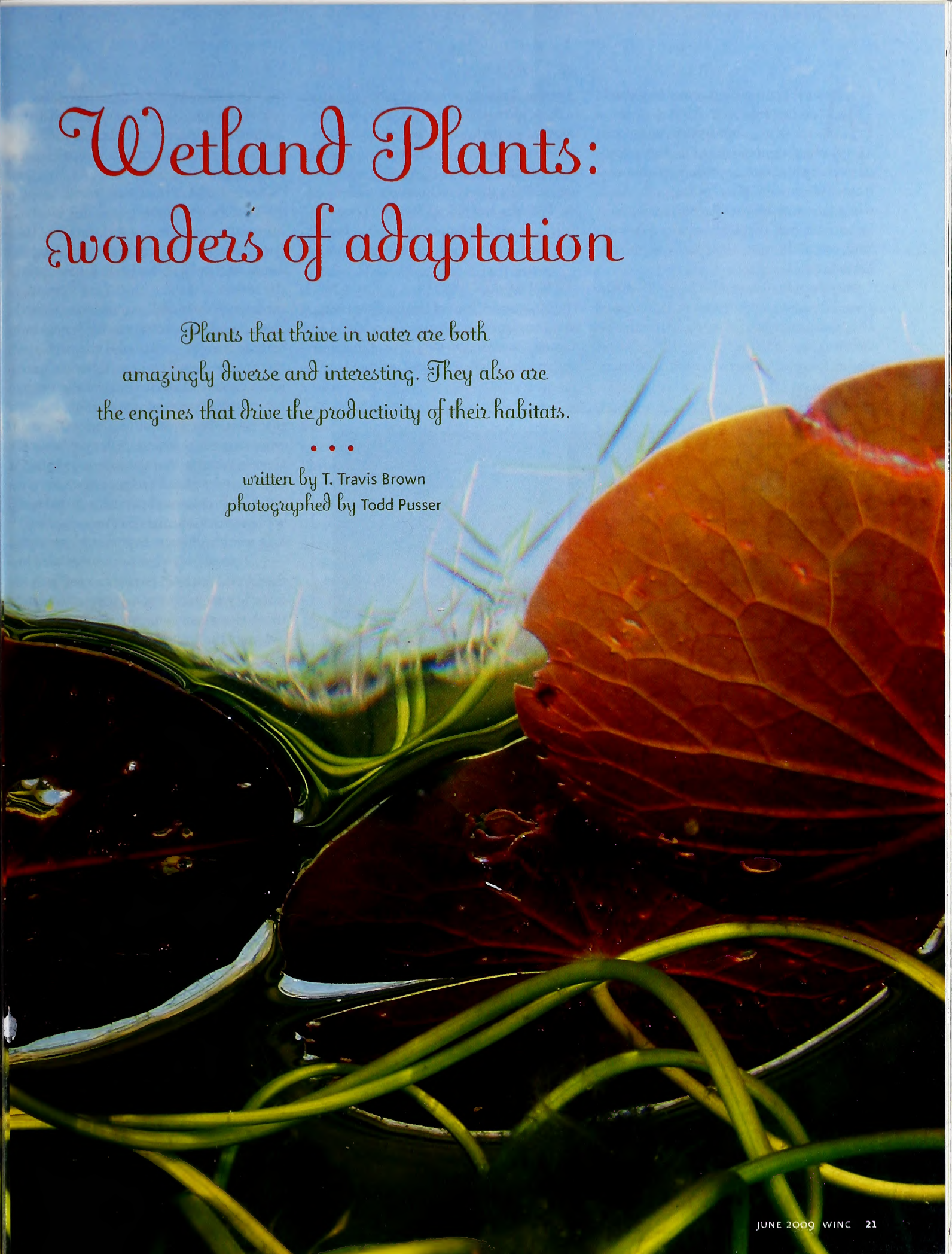


Wetland Plants: wonders of adaptation

Plants that thrive in water are both amazingly diverse and interesting. They also are the engines that drive the productivity of their habitats.

• • •

written by T. Travis Brown
photographed by Todd Pusser



As the sun sets, gray tree frogs begin to move down to the water from the trees. A beaver slaps its tail, and a great blue heron croaks as it takes wing. As evening and rain approach, green treefrogs and squirrel treefrogs begin to sing, while bats and dragonflies hawk the skies for insects. It is a typical evening in a wetland, one of the most biologically productive habitats on the planet.

Anyone who has witnessed 50,000 snow geese take to the skies from a marsh or heard 15 species of frogs and toads call from a Carolina bay can vouch for that. Part of the reason for this productivity is the diversity of wetland plants, or hydrophytes, that live in these habitats. Indeed, wetlands would be useless to waterfowl much of the year without a variety of submerged and floating plants. Invertebrates, mammals, reptiles, amphibians and fish all rely on hydrophytes for feeding, breeding and hiding. Wetland plants and their amazing adaptations provide the foundation for these hugely diverse ecosystems.

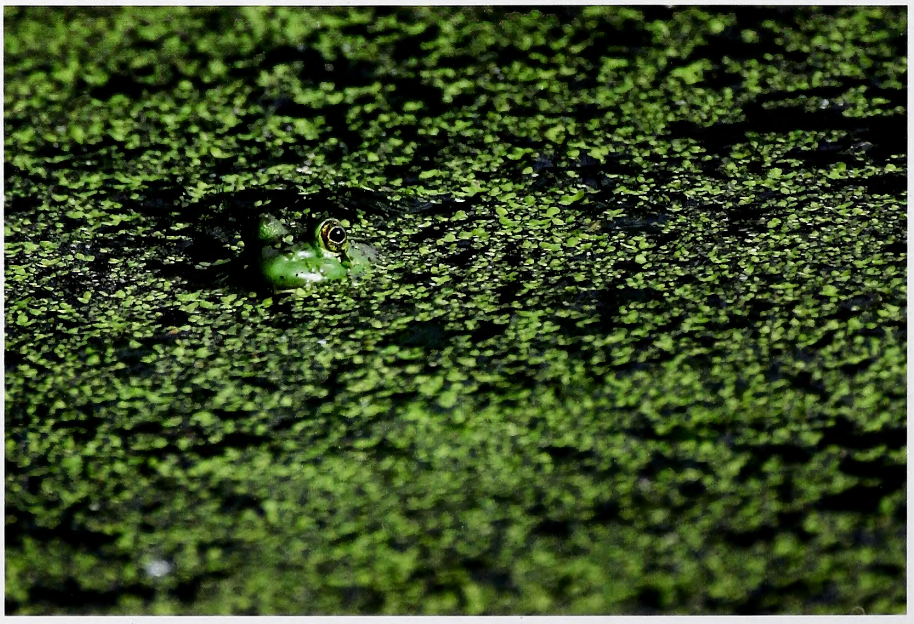
What's a Wetland?

The U.S. Army Corps of Engineers is charged with identifying and regulating wetland impacts. According to the Corps of Engineers' wetland delineation manual, wetlands are those habitats that are very wet for at least part of the year, have plant species that are adapted to living in wetlands, and have soils that show characteristics developed under waterlogged conditions.

Section 404 of the Clean Water Act of 1972 protects wetlands from being filled or otherwise degraded, but delineation of the boundary between wetland and upland is a subject that has been hotly debated since the advent of the act. The Clean Water Act protects all "navigable waters of the United States," and these jurisdictional waters can include streams, canals and other wet areas that are connected to them. However, wetlands are considered to be the shallow-water habitats that have rooted vegetation. It seems that everyone can identify some wetlands when they see them (i.e., salt marshes and cypress swamps), but the difference between upland and wetland becomes more hazy as one tries to delineate seasonally inundated wetlands that, during drier months, don't look terribly different from nearby uplands.

Litigation over what can be regulated by the Clean Water Act has led to a rollback of federal protection for some types of wetlands that lack a direct connection to navigable waters of the United States. Luckily, many states (including North Carolina) now provide state protection for wetlands that are no longer protected by the federal government.

It's important that we maintain protection for as many wetlands as possible because we have already drained or filled many of them. In addition to preserving habitat for waterfowl, amphibians, fish and other wildlife, we are protecting ourselves. Wetland habitats filter our drinking water, protect us from hurricanes and perform many other functions that humans can never hope to duplicate.



Necessity Is the Mother of Adaptation

North Carolina is blessed with a variety of wetland types. From mountain seeps to salt marshes, each type of wetland is home to a different community of plants. No matter what type of wetland they inhabit, plants encounter many of the same environmental stressors in all types of wetlands. Most hydrophytes have developed special adaptations to deal with challenges presented by their environment.

Lack of oxygen is one of the biggest challenges to wetland plants. Many people may be surprised to learn that plants need oxygen

to survive. After all, don't plants turn carbon dioxide into oxygen during photosynthesis? Well, yes, plants produce oxygen as a by-product of photosynthesis—the process by which they turn sunlight, water and carbon dioxide into sugars. However, plants must use those sugars to produce energy for their cells, and their energy-production process (called respiration) requires oxygen. Plants produce more oxygen than they consume, but they still need air.

Water itself contains much less oxygen than air does. Decomposition, the process that eventually breaks dead organic matter down into its basic components, also uses oxygen. Where decomposition runs rampant, aerobic bacteria soon use up most of the available oxygen. Then, bacteria that can live without oxygen take over. Because most of the oxygen is quickly used up by decomposition, inundated wetland soils quickly become anaerobic (without air).

Consequently, wetland plants have adapted to this environment and come up with unique ways of dealing with the lack of air. One method is to keep their roots closer to the surface of the soil. Many wetland plants are shallow-rooted, and some even have floating or aerial roots. For example, cypress "knees" that stick up out of the water are thought to provide extra surface area for the absorption of oxygen.

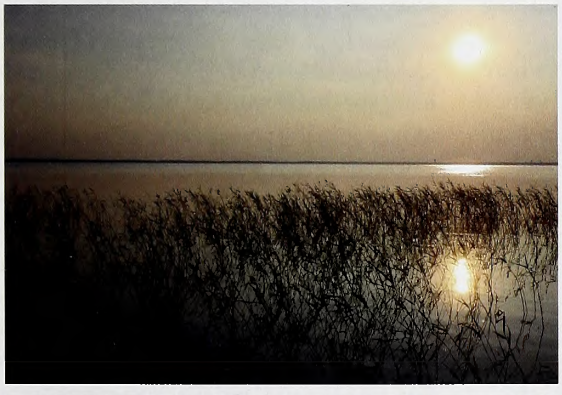
Many wetland plants produce a highly porous tissue called aerenchyma, with large spaces called lacunae inside their stems. This allows oxygen absorbed by the above-water portions of the plant to travel down into the roots to be used in respiration. It's kind of like a snorkel for the roots of the plant.

Some of the most complicated adaptations for dealing with low oxygen are changes in the "Krebs cycle" of plant respiration. When oxygen is not available, plants switch to anaerobic respiration (also known as fermentation). When most upland plants use fermentation, harmful by-products are produced that can kill the plant. This is similar to the way lactic acid builds up in our muscles when our bodies use anaerobic respiration during prolonged exercise. But instead of producing these harmful by-products, many wetland plants can store the chemicals produced during fermentation in nontoxic forms until a dry period when oxygen is available to metabolize them.

Another challenge presented to wetland plants is finding a way to support themselves. Sopping wetland soils are less stable than dry soils, especially for many wetland plants that already have shallow roots. Trees found in wetlands often have noticeably swollen, or buttressed, bases. This adaptation allows for a wider, more stable footing. You can find species such as red maple and swamp tupelo with swollen bases in wetlands, but the same species may not be noticeably swollen on drier sites. The swollen base is actually caused by a buildup of aerenchymous tissue at the base of the tree.

A wider base is not the only unique way that wetland plants support themselves. If completely inundated, many wetland plants will die, so some species are rooted in the bottom and have leaves that float up and down with the water level. Water primrose, water lilies and some types of pondweed employ this strategy. Floating keeps leaves as close as possible to the sunlight, carbon dioxide and oxygen that they need. Aerenchymous tissue helps plants float, and some have developed special air bladders to aid in flotation. Certain plants, such as mosquito fern and duckweed, have taken this adaptation a step further. The entire plant floats on the water surface.

Many plants that have submersed leaves employ a strategy called heterophylly. This means that they grow large leaves at the surface of the water and very thin leaves underwater. The large surface leaves gather



Aquatic plants come in many shapes and sizes, from floating hearts and duckweed (opposite page) to grasses (top left), cypress trees (lower left) and blue flag irises. Plant species have evolved special adaptations to live successfully in watery places.

Plants fill a variety of niches in wetlands. Some grow near the water, others in it, and still others simply float rootless. Pictured are (from left) yellow bladderworts, spider orchids, spatterdock, pink sundews (opposite page, from top), pitcher plants and Venus' flytraps.

sunlight very efficiently, so there is no need to have large leaves underneath, which would only be shaded. The underwater leaves are smaller and have more surface area in proportion to their volume. This means that they have more surface area for absorption of oxygen and carbon dioxide from the water.

As if finding oxygen and standing upright in a wetland weren't hard enough, some plants have to deal with growing in a very nutrient-poor environment. Some wetlands are located in sandy soils that lack nutrients, but in other wetlands it is actually an overbuilt layer of organic matter that makes finding nutrients difficult. Most plants need to have organic material broken down into inorganic molecules by bacteria and other decomposers before the nutrients are useful to them.

But in some wetlands, tannins and other compounds make the water too acidic for decomposers such as bacteria to grow well. Consequently, a thick layer of organic matter develops that prevents plant roots from reaching the inorganic molecules that they need. This nutrient-poor quality of some wetlands actually helps to ensure that only highly adapted species can grow there and may have led to one of the most fascinating plant adaptations. In order to gain nitrogen and other nutrients, carnivorous plants such as pitcher plants, sundews, butterworts, bladderworts and the Venus' flytrap catch and absorb invertebrates in sticky traps.

In contrast, some wetland types are famous for their ability to act as nutrient sponges. They filter runoff of excess nutrients from fertilizers, livestock and other sources. In fact, wetlands are even being constructed to act as a final filter for treated sewage before it enters creeks and rivers. Plants such as cattails and rushes are great at soaking up excess nutrients, including phosphorous and nitrogen, before these fertilizers make it into water bodies where they can cause algal blooms. This is important because algal respiration uses up significant amounts of oxygen at night (when the algae are not photosynthesizing). Also, as algal blooms die, the subsequent decomposition of those algae removes dissolved oxygen from the water, causing fish kills and invertebrate die-offs.

Besides growing large and healthy, plants that act as nutrient sponges in a wetland experience an added benefit. Those that can store up large amounts of carbohydrates in their roots are better able to survive long periods of being flooded. They can use anaerobic respiration (fermentation) to produce the energy that they need from all of those stored carbohydrates.

Life in a wetland is inherently boom and bust. Winter and early spring are when most temporary wetlands fill with water. Spring and early summer bring more rains, warmth and sunshine that feed an explosion of life. But by the time late summer rolls around, temporary wetlands, also called vernal or ephemeral wetlands, may be bone dry. In addition to all of the other challenges presented by wetlands, plants have adapted to the variable nature of these habitats. Many hydrophytes are capable of explosive growth that takes advantage of wet periods, and some can go dormant during dry periods.

Where the Wet Ones Grow

Each species of wetland plant usually grows in one specific zone of the wetland. The emergent zone is home to species that stick up out of the water, such as cattails, soft rushes, black willows and many others. Traveling downslope into the wetland, you will usually encounter plants in the rooted floating zone, including water lilies, pond lilies and certain pondweeds. Next in the downslope progression into the wetland you will encounter the rooted submersed plants. These plants are often referred to as submerged aquatic vegetation and include species such eelgrass, wigeon grass and most species of pondweed. A fourth zone includes those plants that can be entirely free-floating, such as duckweed, water meal and mosquito fern. Almost all wetland plants fit into at least one of these four categories.

Throughout the state, sources of water for wetlands can be similar. Wetlands can be found around springs, in stream floodplains

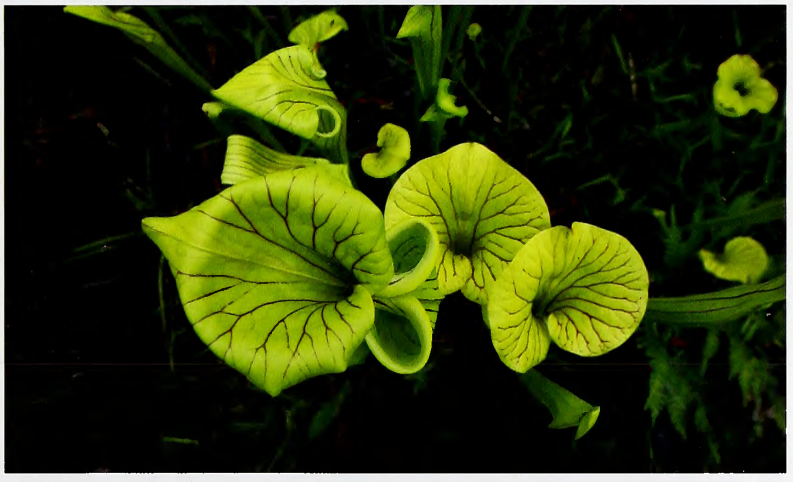
and in isolated depressions. Some types of wetlands, such as beaver ponds and isolated depressions, can be found across North Carolina; however, the plants that inhabit each wetland type differ because of characteristics of the soil, water, climate and topography.

For instance, mountain bogs are usually simple depressions or flat areas that hold water. However, elevation, rocky layers, age since glaciation and many other factors shape them into very unique plant communities. These wetlands often include sphagnum moss, Eastern hemlock, red spruce, alders and mountain laurel. In the Coastal Plain a similar depression might be home to a wetland called a pocosin (an Algonquian word meaning swamp on a hill). These shrubby jungles occur on thick organic soils that accumulate in ancient Carolina bays or on flats between streams. They are usually filled with evergreen shrubs such as inkberry, gallberry and fetterbush and often include a canopy of scattered pond pines. In both cases, wetland plants have put together a unique combination of adaptations in order to live in their environment.

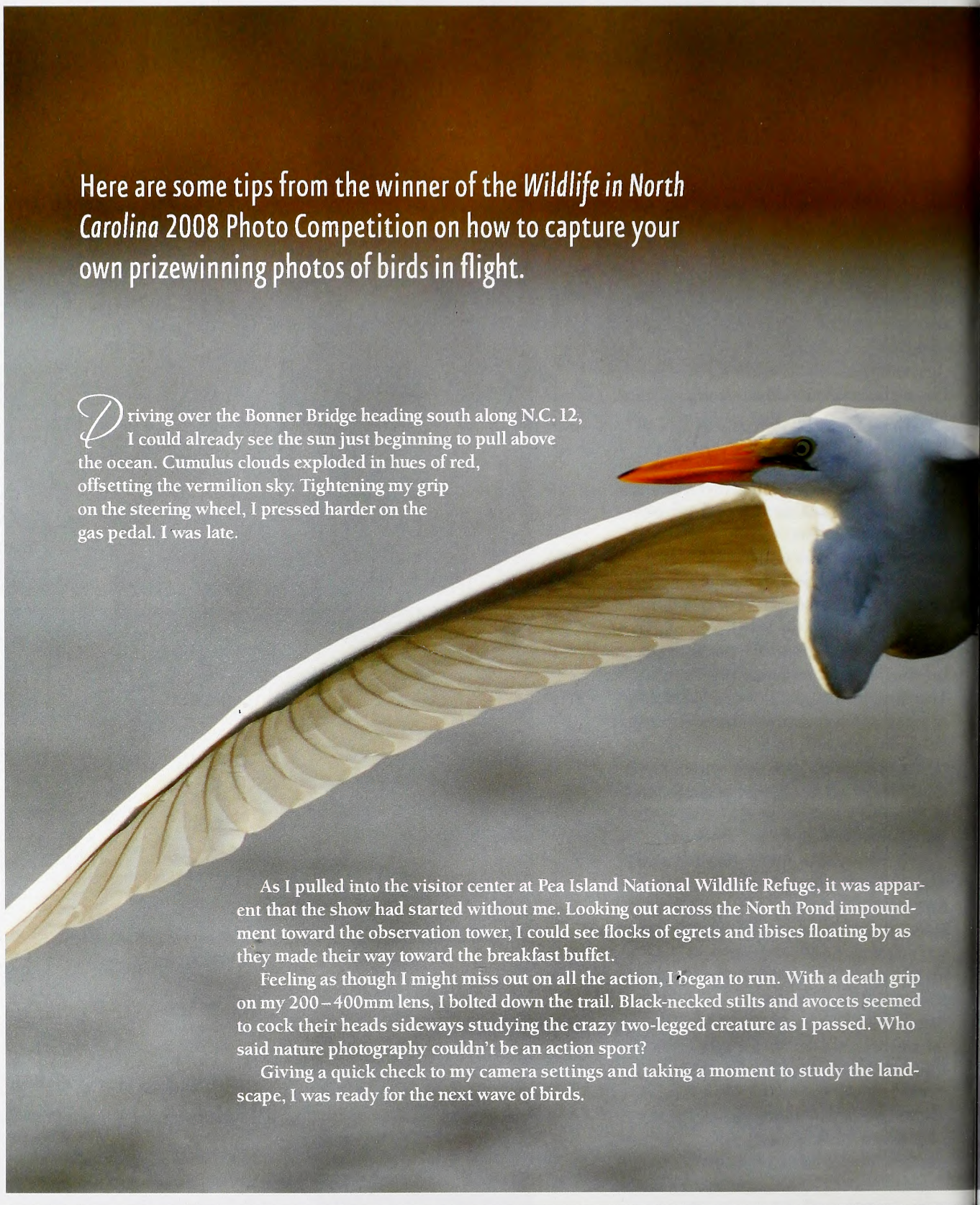
In some ways the wetland plants that inhabit our estuaries and marine wetlands have reached the pinnacle of adaptation. Not only do they have to deal with relatively huge fluctuations in water level because of tides, but the fluctuations happen very quickly. This gives the plants a short period of time to adjust to whatever the water level may be doing. In addition, plants in these environments have to deal with the drying effect of saltwater. So these plants are not only hydrophytes; many of them are also halophytes (salt plants) as well.

Wherever you are in the eastern United States, there is a wetland nearby with something to teach you about plant adaptations. So the next time you see a ditch full of cattails, you may see a bunch of green snorkels sticking up from roots embedded in anaerobic soil. If you see a low, wet spot, you may notice that the plant species change abruptly where the soil becomes too wet for upland plants. If you see a tree uprooted in a wetland next to a large standing tree with a buttressed base, you will know why. Enjoy getting your feet a little mucky while learning about and enjoying some of these wetland wonders. ⬘

Biologist T. Travis Brown works in North Carolina and elsewhere in the southeastern United States.



Here are some tips from the winner of the *Wildlife in North Carolina* 2008 Photo Competition on how to capture your own prizewinning photos of birds in flight.



Driving over the Bonner Bridge heading south along N.C. 12, I could already see the sun just beginning to pull above the ocean. Cumulus clouds exploded in hues of red, offsetting the vermilion sky. Tightening my grip on the steering wheel, I pressed harder on the gas pedal. I was late.

As I pulled into the visitor center at Pea Island National Wildlife Refuge, it was apparent that the show had started without me. Looking out across the North Pond impoundment toward the observation tower, I could see flocks of egrets and ibises floating by as they made their way toward the breakfast buffet.

Feeling as though I might miss out on all the action, I began to run. With a death grip on my 200–400mm lens, I bolted down the trail. Black-necked stilts and avocets seemed to cock their heads sideways studying the crazy two-legged creature as I passed. Who said nature photography couldn't be an action sport?

Giving a quick check to my camera settings and taking a moment to study the landscape, I was ready for the next wave of birds.

Birds on the Wing

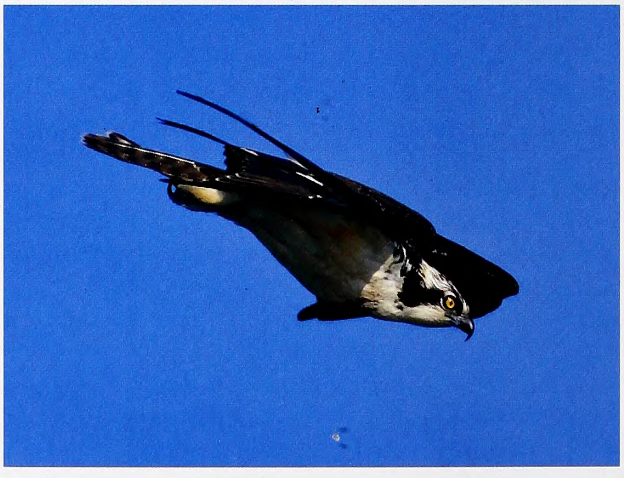
Written and photographed by Jared Lloyd

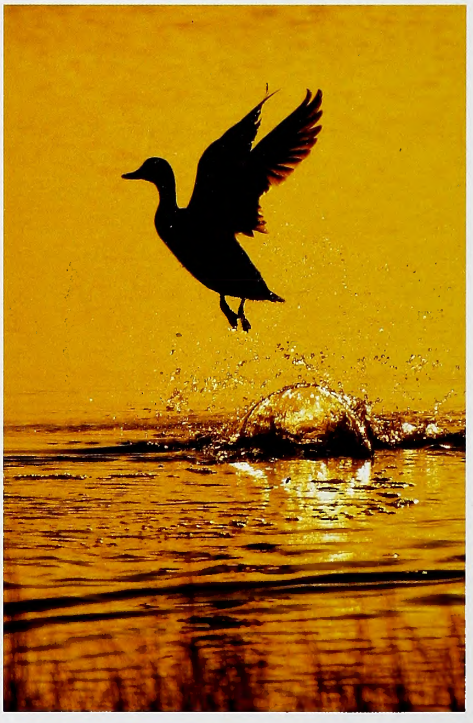
On Their Terms

Unlike other types of bird photography, shooting these avian creatures in flight is a dynamic, fast-paced sport. On the ground, in the water or on perches, birds are vulnerable. On the wing, however, a bird soaring through the air is in its element. Great blue herons that spook from 50 yards away on the ground will routinely fly just 20 feet from you on their own terms.

With a little bit of homework and some basic knowledge of bird behavior, a photographer looking to photograph birds in flight quickly sheds the need to carry the massive lenses that people associate with serious wildlife photography. Instead, lenses in the 200–300mm range become the lenses of choice. In fact, the benchmark standard for many pros when it comes to birds in flight is a 300mm *f*4 lens. Due to the erratic nature of a bird's flight path, hand-holding the camera and lens is often the preferred means of photographing in these situations. A 300mm telephoto lens has the benefit of weighing roughly 3 pounds, versus a 600mm, which weighs in at a whopping 11 pounds.

Flight photography, however, is not something in which you can simply walk up to your subject, take a snapshot and walk away—for obvious reasons. To be successful at photographing birds on the wing, you must master a couple of techniques and understand a few concepts in order to make the most of your sessions. Realize, though, that some of these concepts do not hold up in every situation, and sometimes the most powerful images break all the photographic rules. Yet, to break the rules successfully, you must understand how and why they work to begin with.





With the proper equipment and an understanding of some core techniques, beginning photographers can be well on their way to taking high-quality outdoor photos of the highly kinetic world of birds.

LIGHT. Photography is, in the literal sense, writing with light. Lighting should always be your first consideration when it comes to photographing anything, not just birds. There are of course many different types of light: bright, garish midday lighting; the soft, warm light of sunrise and sunset; the even light of an overcast day that diffuses shadows and highlights. Then there is the direction of the light in relation to your subject: frontal lighting, sidelighting, backlighting.

When it comes to photographing birds in flight, the rule of thumb is that frontal lighting is best. This means you want to photograph with the sun at your back. Frontal lighting fully illuminates the bird, making the colors pop in good-quality light. Keep in mind, though, that with white wading birds such as great egrets, depending upon your camera's metering system, you may have to open up your exposure by one or two stops in order to record the bird as white without blowing out the highlights.

SHUTTER SPEED. In order to capture tack-sharp images of birds in flight, you must use the appropriate shutter speed. Figure that you will need a shutter speed of at least 1/500 of a second in order to stop the action of the bird. Larger birds such as bald eagles, pelicans and great blue herons flap their wings more slowly than do smaller birds such as ducks. A shutter speed of 1/500 is usually enough to stop the larger birds, but you may need at least 1/800 or 1/1000 to stop the smaller birds at times.

In order to use these shutter speeds, however, you must have the proper ISO for the type of light. This is the speed of your film —although ISO speeds are adjustable on digital cameras as well. ISO speeds of between 400 and 800 are what I try to use for this sort of action-based photography. Just remember, though, that the higher the ISO number, the more grain (film) or noise (digital) you will have in the image.

APERTURE. The aperture and shutter speed of your camera are two creative tools that, used in conjunction, give you the ability to choose how you communicate the subject of your image.

With each aperture setting we achieve a different depth of field. Using an *f*-stop of 22 is great for landscape photography when you have foreground, middle ground and background elements that you want all in focus and sharp. However, with wildlife photography, not only do you often want the most light so you can use faster shutter speeds, but also you typically (but not always) want to isolate your subject from its surroundings.

A larger aperture (smaller *f*-stop number) will allow more light to reach your film plane or sensor but will give you a narrower depth of field. For instance, when using an aperture of *f*/4, what your focus sensor is on will be in focus, but everything else falls out of focus —and more out of focus the further it is from the focal point. For birds in flight, I typically shoot with an aperture setting of between *f*/4 and *f*/8 depending upon the lighting conditions and what I want to communicate with the image.

BACKGROUND. It cannot be stressed enough how important the background of a photograph is —especially with wildlife photography. Even though you might be shooting with a large aperture in order to isolate your subject and make it stand out from the background, the texture, lighting, and simplicity or complexity of the background still have a profound impact upon your photograph. By simply moving a few steps, you can often change the background to a more pleasing component of the photograph.

WIND. The direction of the wind dictates not only the direction that birds face while perched but also the direction in which they take flight and land. When given a choice, birds face the wind. Keep this in mind and you can position yourself for some truly breathtaking photographs. Like with the sun, it is a good idea to keep the wind at your back when photographing birds. This way the birds will be facing you as they take off or land, wings outstretched and full of drama.

FOCUS. A bird in flight can be difficult to maintain focus on. Not only can a bird's path be extremely erratic, with its changing altitude, angles, and banking back and forth, but the background that the bird is flying in front of may also be changing. This is usually too much for your camera's autofocus to keep up with. Therefore, it's best to simplify.

The center focusing point of your camera is the fastest spot to autofocus. This is just how your camera is designed. With this in mind, go ahead and select the center focusing point and lock it into position. If you do not lock this point in, then your camera's autofocus may jump around, both trying to track the bird in flight and switching back and forth from high-contrast objects in the background to the bird you are trying to focus on. If you lock the focus on the center, you will know where the camera will focus.

Once you have located the bird that you want to photograph, do not wait until it is right in front of you before you attempt to focus on it! Long before the bird gets into position, lift up your lens, train the center focus point on the head and neck of the bird and bump the autofocus. As the bird is coming in, continue to just bump the autofocus every couple of seconds until the bird is in place where you want to photograph it.

PANNING. Once you have your camera settings figured out and the proper exposure dialed in, you still need good technique to capture sharp images, especially when attempting to hand-hold your lens and camera instead of using a tripod. Proper telephoto hand-holding technique requires you to cradle the lens (not the camera) with your left hand while holding the camera with your right. You then pull both elbows in toward your body and push the camera against your face.

Once you are in position like this, train the center sensor on the bird's head and neck and rotate your torso (not just your head and arms) to pan with the bird. When the bird comes into position, do not stop following it in this manner. Simply squeeze the shutter button down while continuing to pan with the bird. Make sure that you have your camera set to shoot as many frames per second as it can.

Focusing Your Efforts

Follow and practice these guidelines, and you will notice a big improvement in the images that you are producing. Above all, though, when it comes to any type of wildlife photography, do your homework. Know the basic biology of the species that you are going to be photographing. Scout the area ahead of time. Know where the sun will rise and set, which way the wind will be blowing and what obstacles you might encounter.

With a little bit of preparation and a good bit of practice, these guidelines for photographing birds on the wing should greatly improve your success. ◆

Jared Lloyd, freelance writer and photographer, was the grand prize winner in the Wildlife in North Carolina *2008 Photo Competition.*

WILDLIFE IN NORTH CAROLINA
2009 PHOTO COMPETITION

PATRICK COIN

Wildlife in North Carolina magazine is pleased to announce that UNC-TV has joined us as a co-sponsor for our fifth annual photo competition. We encourage nature photographers to watch the award-winning PBS show "Nature" on North Carolina Public Television as a great way of learning about the wonderful world around us.

Our founding partner, the N.C. Museum of Natural Sciences, returns as a co-sponsor. The museum is a fantastic place to learn about North Carolina's wildlife and wild places. Our other co-sponsor, the N.C. Division of Parks and Recreation, manages North Carolina's outstanding state parks. These are ideal places to photograph wild animals and wild landscapes. Park rangers can give photographers expert advice on the best subjects, locations and times of year for nature photography in state parks.

Beautiful nature photos from North Carolina have inspired generations of people to be better stewards of our precious natural resources. Excellent wildlife photography from across the Mountains, Piedmont and Coastal Plain has been the cornerstone of *Wildlife in North Carolina* magazine and of exhibits at the N.C. Museum of Natural Sciences for many decades.

The Wildlife in North Carolina Photo Competition aims to encourage people to participate in nature photography, thereby fostering greater understanding and appreciation of North Carolina's wildlife and wild places. Winning photographs will be published in the January 2010 issue of *Wildlife in North Carolina*. Thanks to our exhibition sponsor, JW Photo Labs of Raleigh, the winners will be exhibited at the Museum of Natural Sciences and at other locations across the state in 2010.

Visit www.ncwildlife.org, the museum, any of North Carolina's 39 state parks, or any location of our corporate sponsor, Great Outdoor Provision Co., for information about the competition. Then get outside and show us your best nature photos!

2009 COMPETITION RULES

WHO MAY ENTER

Amateur and professional photographers, except for employees of the N.C. Wildlife Resources Commission, the N.C. Museum of Natural Sciences, the N.C. Division of Parks & Recreation and UNC-TV, and their immediate families (children, siblings and spouses).

WHAT TO ENTER

Photos will be judged in 10 categories:

Birds

Mammals

Reptiles and Amphibians

Invertebrates

Peaks, Valleys and Plains: Our landscape category.

Wild Plants: Wild-growing plants only, including their flowers, leaves, fruits and other parts. Absolutely no cultivated plants will be accepted. Mushrooms and other fungi should be entered in this category.

Outdoor Recreation: Show how people interact with North Carolina's natural world through activities that are inextricably linked to nature, such as hunting, fishing, hiking, rock climbing or canoeing.

Animal Behavior: Anything animals do, from everyday activities to interactions with other animals to unusual behavior.

Youth Photographer, 13 – 17: Any of the above subjects, shot by photographers under 18.

Youth Photographer, 12 and under: Any of the above subjects, shot by children 12 and younger.

Photographs must have been taken in North Carolina no earlier than Sept. 15, 2004.

You must declare on your entry form if your photograph is of an animal in captivity, such as at a zoo, nature center or rehabilitation facility. Please do not enter photos of animals that are both captive and non-native to North Carolina (for example, polar bears or lions at the N.C. Zoo).

No pets or domestic animals will be accepted, with the exception of animals participating with people in outdoor recreation (for example, hunting dogs or riders on horseback).

Please do not harass wildlife in an attempt to photograph it.

Manipulation of images, either film or digital, should be limited to conventional darkroom techniques or basic sharpening and cropping. Images should contain only the subject matter as originally seen through the viewfinder. Multiple exposures, digitally stitched photos and images containing any manipulated or added content will not be accepted and should not be entered.

Entries may not contain any text aside from that contained in the subject matter. Date stamps, signatures and trail camera information are not permitted, regardless of whether they are added during or after the image is photographed. Original images may be cropped to eliminate date stamps or other text.

An entrant must hold all rights to a photograph. Photos previously published or pending publication, or that violate or infringe upon another person's copyright, are not eligible. Please do not infringe on the rights of property owners in an attempt to photograph animals.

HOW TO ENTER

Visit www.ncwildlife.org, click on the Photo Competition link, and then click the **Enter a Photo** link to submit a photograph. Only JPG files smaller than 2 MB will be accepted for upload. Upload your photo using the online entry form on the Web site. Repeat this process for each photo entered. Entrants may submit a maximum of three (3) photos per category.

The competition begins at 8 a.m. on June 1, 2009. Entries must be uploaded by 5 p.m. on Monday, Sept. 15, 2009. Entrants may verify receipt of entries by checking www.ncwildlife.org and clicking the Photo Competition link to view a text list of all entries.

An image may be entered in only one category. For instance, if a photo of a wood duck preening might fit in Birds or Animal Behavior, you must choose the one category in which you want the image to compete.

Entrants in the youth categories must be the appropriate age for the category entered on the closing date of the competition. Once a youth photographer has entered three photos in their category, they may enter other photos in any other categories they wish.

PRIZES

All winners will be published in the January 2010 issue of *Wildlife in North Carolina* magazine and exhibited at the N.C. Museum of Natural Sciences in Raleigh. Winners will also receive a print of their winning entry from JW Photo Labs of Raleigh and products from sponsor Great Outdoor Provision Co.

Grand prize: Your photo published on the cover of the January 2010 issue of *Wildlife in North Carolina* magazine, plus $200.

First place, all categories: $100.

Second place, all categories: $75.

Third place, all categories: $50.

Special state parks prize: One photo taken in North Carolina state parks, regardless of category, will be selected as Best of State Parks. The winner will receive camping passes at their choice of North Carolina state parks and other noncash prizes to be determined. Finalists in consideration for this honor will be exhibited at various parks across the state.

JUDGES

Winners will be selected by a panel comprised of staff of the N.C. Wildlife Resources Commission, N.C. Museum of Natural Sciences, N.C. Division of Parks and Recreation and professional wildlife photographers.

THE FINE PRINT

By entering the Wildlife in North Carolina 2009 Photo Competition, entrants grant all sponsors the right to publish and use submitted photographs in print or electronic form to promote the competition. Reproduction of entries will include photographer credit.

Entrants agree that if their submission is selected as a winner, they grant all sponsors the right to display their photograph(s) at venues including but not limited to the N.C. Museum of Natural Sciences. Exhibition of entries will include photographer credit.

Entrants will be asked on the online entry form if their photo was taken in a North Carolina state park. All such entries will be provided to the N.C. Division of Parks and Recreation for possible usage in public information/promotional materials, park displays or agency press releases to various media outlets. Any such usage will include photographer credit.

Winners will be required to provide original source material — slides, high-resolution digital files or negatives — for reproduction in the magazine and for exhibition prints. Original digital files of winning photos must be accompanied by a color print of at least 4x6 inches.

Wildlife in North Carolina staff will determine entry eligibility.

QUESTIONS?

Please do not call about entries.

Send questions to competition@ncwildlife.org.

Enter online at www.ncwildlife.org.

Scientists still debate the origins of

Our Beautiful Balds

written and illustrated by Helen Correll / nature activity by Anne M. Runyon

APPALACHIAN AVENS

We usually think of the word bald as meaning "having no hair." True, bald people don't have a full head of hair, but bald eagles are not featherless on their heads. That meaning of bald is "having a white patch," and refers to their white head feathers. Tires are bald when their tread is completely worn. And what about a "bald-faced lie"?

Even though these usages of the word bald sound different, they all refer to the same thing: Each has something lacking. A person's bald head is lacking hair, the eagles' feathers are lacking color, the tires are lacking tread, and the lie is lacking any attempt at disguise.

BALD BASICS

So what do you call a mountain lacking trees? Bald, of course! Unlike their neighbors' thick, forested slopes, bald mountains have no trees; instead they are covered in native grasses, wildflowers or low-growing shrubs. They occur on the shallow, rocky soils found on the highest ridges of the southern Appalachians from Georgia, along the North Carolina-Tennessee line, and into Virginia. Even though severe weather is not the main reason balds occur, plants growing there have to endure it. Strong wind, high rainfall and frequent fog are common in the high mountains, along with extreme temperatures. At elevations of over 4,600 feet, and with nothing to obscure the view, balds offer some of the most beautiful panoramic vistas in the Southeast.

FLAME AZALEA

THREE-TOOTHED CINQUEFOIL

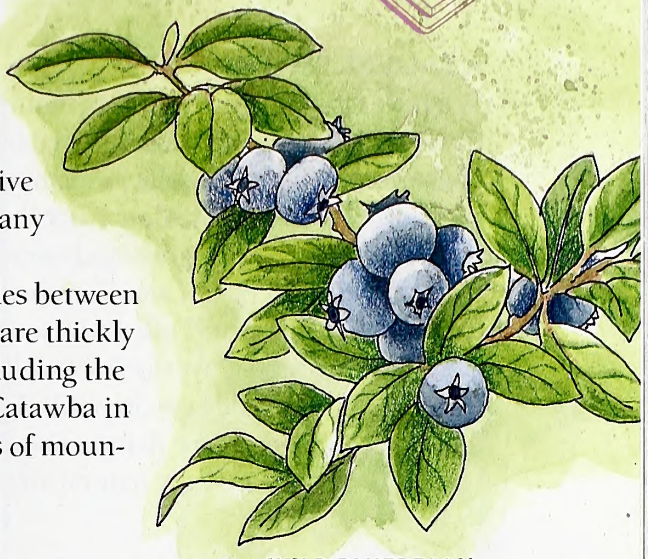
TWO KINDS OF BALDS

The two kinds of balds, grassy balds and heath balds, are so named because of the plants that grow there.

Grassy balds are found on rounded summits. These mountain meadows are dominated by mountain oat grass, Pennsylvania sedge, and other tough native grasses that thrive in the shallow, rocky soil. Grassy balds are also home to many endangered wildflowers, including the rare Gray's lily.

Heath balds are most often located along ridges and saddles between mountains, where the soil is thin and nutrient-poor. They are thickly covered with evergreen shrubs from the heath family, including the showy rhododendrons (rosebay in lower elevations and Catawba in higher elevations), flame azaleas, mountain laurel, cushions of mountain myrtle and various wild blueberries.

GRAY'S LILY



WILD BLUEBERRY

MYSTERIOUS HISTORY

Scientists have three hypotheses about the origin of Appalachian balds. One suggests that they are left over from glacial activity occuring between 10,000 and 20,000 years ago. This would explain how plants common in Canada, such as three-toothed cinquefoil, pop up on some of North Carolina's balds: They could have been pushed ahead of the glaciers and then stranded as the ice retreated. The glaciers also damaged the soil and made it too thin for trees to grow.

Another is that the trees were killed by fire caused long ago by lightning. Fire-damaged soil loses the nutrients that trees need to grow and encourages acid-loving plants such as rhododendrons, laurels and blueberries. Supporting this hypothesis is the fact that a few of North Carolina's balds, like Black Balsam Bald in Haywood County, are known to be a result of clear-cut logging in the early 1900s, which was followed by fires caused by sparks from locomotives. The fire-damaged soil has prevented forest regrowth on these mountains.

The third hypothesis points to prehistoric peoples. Arrowheads and other artifacts have been found on some balds suggesting that perhaps the openings were cleared by humans for grazing, or to attract wildlife for hunting.

CATAWBA, ROSEBAY AND CAROLINA RHODODENDRON

A BALD DILEMMA

Whatever their beginnings, it is thought that many of the open areas were first maintained by grazing of huge Pleistocene plant eaters such as mammoths, mastodons, ground sloths and musk oxen. After these ancient herbivores died off, the open grasslands were still kept grazed by bison, elk and deer. Later, European settlers exterminated the bison and elk and used the balds for farming and grazing livestock. Now, however, most of the Appalachian balds are on public land, and are protected. This opens a new debate: should they be maintained? Or, if they are truly natural areas, shouldn't they be left alone?

Without grazing or the occasional fire, could some of the grassy balds be in danger of disappearing? These questions are still being discussed and debated by caretakers of the balds, such as park rangers and botanists who study the balds' complex habitats. Today, some balds on public land are being maintained by mowing, while others are not.

But one thing is not being debated: the views are breathtaking. Standing on one of these beautiful mountain balds makes you feel as if you're on top of the world.

PLEISTOCENE PLANT EATERS

Read and Find Out

- "Appalachian Wildflowers" by Thomas E. Hemmerly, University of Georgia Press, 2000.
- "The Appalachian Forest" by Chris Bolgiano, Stackpole Books, 1998.
- "Appalachian Mountains" by Jan Mader, Children's Press, Scholastic, 2004.

On the World Wide Web:

- The Southern Appalachian Highlands Conservancy: www.appalachian.org.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Get Outside

Take a hike and experience our beautiful balds. Fairly easy access can be found at Wayah Bald (Nantahala National Forest, near Franklin) and there is a one-mile loop trail at Max Patch, on the Appalachian Trail (near Hot Springs). Try Grassy Ridge Bald (Appalachian Trail, bordering Avery and Mitchell Counties) for a moderate day hike. Don't forget to take a journal to record what you see in words or drawings.

Mountain myrtle grows on both heath and grassy balds.

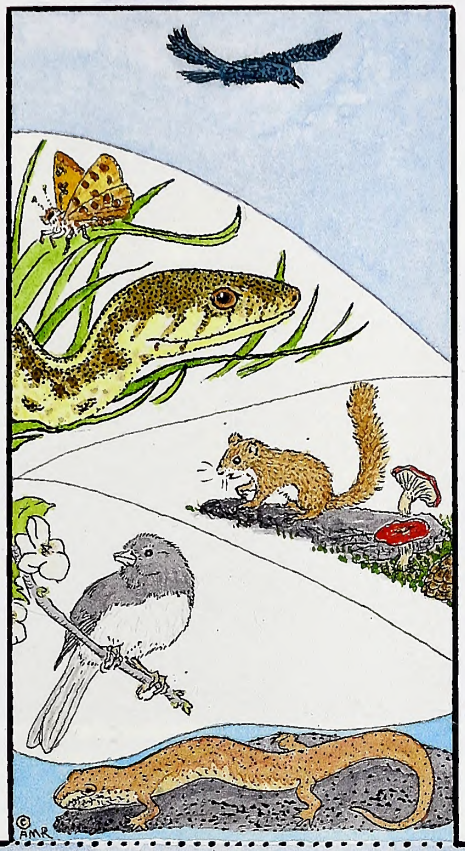
Make a Mountain Bald Lift and Drop Card

1) Cut out your card design along the black outlines.

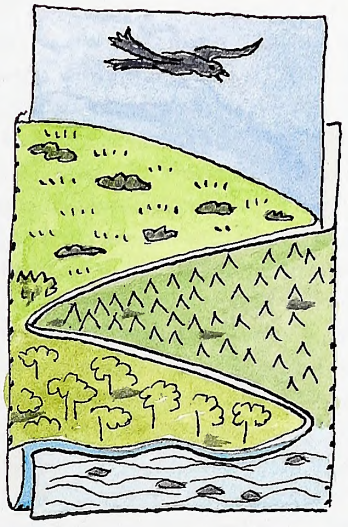
2) Fold down along the ···· lines.

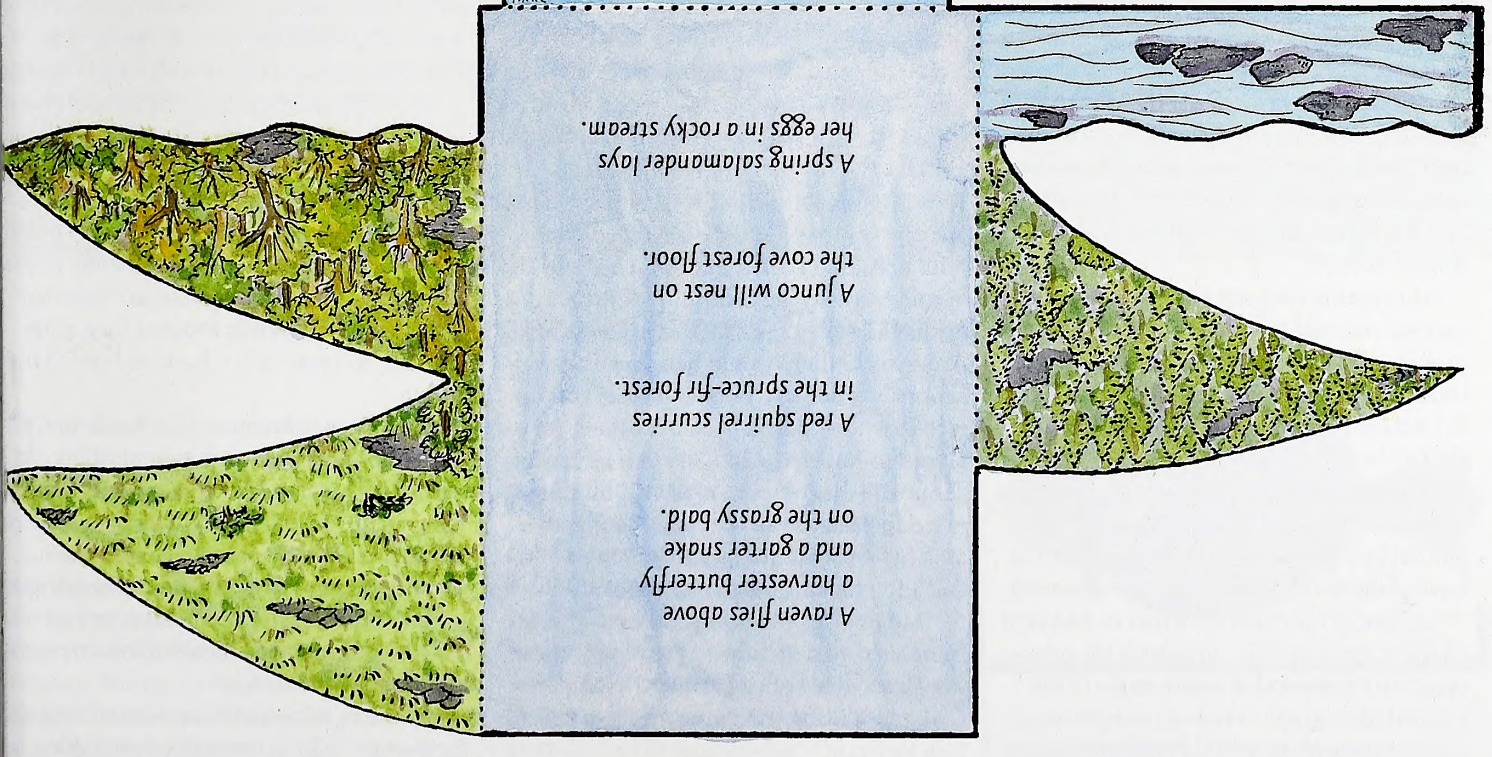
3) Glue the animal pictures down inside the card.

4) Now fold each habitat flap over its animal.



Now you can see who lives where as you climb up the mountain to the high bald top.





This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

State Record Catfish Returns from the Past

It was a chunk of shrimp that landed Rocky Mount angler E. J. Bowden his state record channel catfish back in 1970, and it was a stack of papers that gave him back the state record nearly 39 years later.

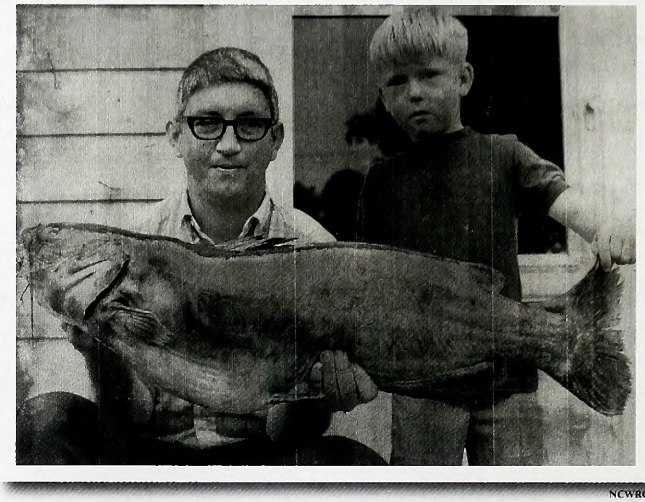
On Sept. 1, 1970, Bowden caught his record catfish, which weighed 23 pounds, 4 ounces, from City Lake in Rocky Mount, only to see it broken less than a year later by a catfish that weighed nearly 18 pounds more.

Turns out, the fish that broke Bowden's state record from 1970 wasn't a channel catfish—a discovery made 34 years later after an article in the May 2005 issue of *Wildlife in North Carolina* showed an old photograph of Pete Paine holding up his record-breaking "channel cat" that was actually a flathead catfish.

With no information available about channel catfish state records preceding Paine's, the N.C. Wildlife Resources Commission vacated the channel catfish state record in 2005. In the four years since, the record has been broken three times, most recently by "Barbie Doll" angler David Hayes, who famously caught a 21-pound channel catfish using his granddaughter's Barbie Doll fishing rod in August 2008.

After seeing the media coverage about the various channel catfish state records being broken, Bowden contacted the Division of Inland Fisheries, which oversees the State Record Fish Program, and advised staff that the fish he caught way back in 1970 outweighed Hayes' record-breaker by more than 2 pounds. He even had a write-up accompanied by a picture from the Sept. 6, 1970, issue of the *Rocky Mount Telegram* to prove it.

He sent in the paperwork that he had kept all these years, which, along with the newspaper article, included a photocopy of the original photograph, a state record certificate, and an excerpt from a *1971 Freshwater Fishing and Hunting in North Carolina Atlas*, listing all of the freshwater fish state record-holders of the day, including Bowden.



NCWRC

E.J. Bowden and son Louis display record catch 38 years ago.

After carefully reviewing the stack of documents and the photograph of the fish, Kent Nelson, fisheries program manager with the commission, agreed with Bowden. He was still the official holder of the channel catfish record in North Carolina.

Nelson said the Wildlife Commission had no state record channel catfish paperwork prior to Paine's 1971 record, which is why the agency vacated the record in May 2005. Without Bowden's picture and accompanying paperwork, there would have been no way anyone would have known he was still the record-holder. The fish itself was long gone, although Bowden said he kept it on ice for about 10 years, hoping to have it mounted one day. That day never came, so Bowden took his record-setting catfish to the woods and left it for animals to consume.

"Mr. Bowden's state record, as well as Mr. Paine's record that turned out to be a flathead, were both established prior to the Wildlife Commission administering the State Record Fish Program," Nelson said. "The N.C. Division of Travel and Tourism administered the program until the mid-1980s, at which point the Division of Inland Fisheries took over."

The Wildlife Commission now requires anglers seeking state-record certification for freshwater fish to submit with their applications a full, side-view photo of the fish. Anglers must catch their fish on hook-and-line only; weigh the fish on certified scales and have the fish examined by a qualified expert from the commission.

Although he is now 70 and admits his memory isn't as a good as it used to be, Bowden says he remembers the day he reeled in the record-breaking catfish quite well. He was fishing with his son Louis, who was 5 years old at the time, at the 10-acre City Lake, which is located off Sunset Avenue at the Tar River. The fish hit the shrimp chunk and the line started whizzing. He called Louis over to hold the rod, but soon realized that his son was no match for the fish.

"When Louis got hold of the pole, I found out in a hurry that he couldn't handle it; the daggone fish was pulling him in," Bowden recalled. "The fish was about as long as he was tall, so I just took it back and reeled the fish in."

A lifelong fisherman, Bowden is pretty excited about the reinstatement of his old record. "This has just made my day, I'm telling you," Bowden said. "It wasn't a life or death situation, but it did mean a lot to me."

"I'm sure someone's going to break this record but at least it's entered now and it's official so if someone breaks it tomorrow, I'll say more power to 'em."

For more information on North Carolina freshwater fishing records, or on fishing in public, inland waters, call the Division of Inland Fisheries at (919) 707-0220 or visit www.ncwildlife.org.

Let Wildlife Remain Wild

Several recent high-profile cases involving white-tailed deer have prompted the N.C. Wildlife Resources Commission to remind everyone that tampering with wildlife jeopardizes innocent people and harms the ecosystem.

NCWRC

"No matter how sweet it acts or how cute a name you give it, this is still very much a wild animal," said Sgt. Kelly Brantley, a wildlife enforcement officer with the commission. "The fawn nibbling from your fingers could become the young buck attacking a neighborhood child, which happened in September. Taking an animal to another location could be introducing a disease that will destroy the herd. We have seen it far too often. Even with the best of intentions, disregard for nature leads to a bad end and could be a violation of the law."

Typical reasons given for involvement in these incidents include the following:

"The fawn was abandoned." Not true. Fawns that look abandoned almost always are not. A doe will hide fawns in tall grass while she looks for food, often for many hours. If you see a fawn alone, do not approach it, do not offer it food and, certainly, do not take it.

"The fawn was orphaned." Unlikely, but possible. If a fawn is in the exact location after more than 24 hours and bleating loudly, or if a fawn is lying beside a dead doe (likely at the side of a highway), do not attempt to take it. Instead, call (919) 707-0040 for the phone number of a local permitted fawn rehabilitator.

"The fawn was alone and scared." True. Late April through early June is when deer give birth in North Carolina. Dappled and lacking scent, fawns are well camouflaged and usually remain undetected by predators while the mother is away feeding. The fawn is naturally scared—of you—and for good reason.

"I love animals and want to help them." Perhaps. People who truly love wildlife recognize the importance of sound conservation practices, maintaining habitat and allowing wildlife to be wild animals without interference. Taking a fawn into your possession is ultimately an inhumane and illegal act.

"Wild animals are not meant to be pets," said Perry Sumner, a state wildlife biologist. "While it is true that some wild animals can be tamed, especially if they are raised by humans, they never totally lose their wild instincts. Those instincts can show up anytime and the results can be harmful to people and the animal. An otherwise very friendly and 'tame' male deer can turn into a raging bundle of aggression when breeding season begins.

"The world is full of examples of hand-raised deer becoming dangerous and even injuring the very people that cared for them," Sumner said. "Wild animals are born with instincts to survive many situations in nature. Those instincts do not simply disappear when people step in and attempt to 'rescue' the animal. Wild animals should be allowed to remain wild, to develop their survival instincts as nature intended and to live the life a wild animal should live."

Stringent captivity and transportation laws for deer are enforced in North Carolina to prevent the spread of illness, including Chronic Wasting Disease (CWD), an always fatal, contagious neurological disease affecting deer, elk and moose.

"Laws governing the handling of deer are in place for good reason and we enforce them for good reason," said Sgt. Brantley.

Besides the far-reaching environmental damage that CWD would cause, there would also be a massive economic impact. Deer hunting is big business in North Carolina. More people hunt white-tailed deer than any other game species in the state. Sportsmen will spend approximately $311 million on deer-related hunting expenses every year, with some 250,000 men and women taking more than 2.9 million trips afield here in pursuit of deer. Nationally, the U.S. Fish and Wildlife Service reports some 10.3 million deer hunters and their hunting-related expenditures total nearly $10.7 billion a year.

Marine Fisheries Drops Flounder Size Limit

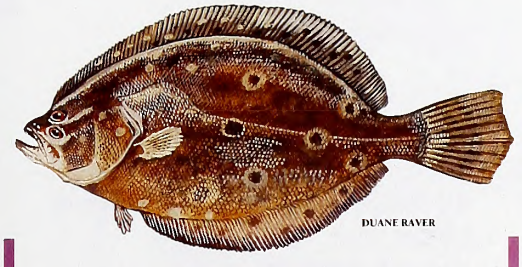
The size limit for recreationally caught flounder has decreased to 15 inches in many coastal waters of the state. The old size limit was 15.5 inches.

The new size limit, which took effect April 1, applies to flounder caught in the ocean and eastern sounds, from the Virginia state line to Browns Inlet near the Camp Lejeune Marine Corps Base in Jacksonville. Specific lines are detailed in the proclamation at www.ncfisheries.net.

The size limit decrease is allowable because recreational catches of summer flounder in 2008 were approximately 42 percent below the state's allocation of the Atlantic States Marine Fisheries Commission's coast-wide recreational quota. North Carolina had been allocated 115,000 fish for recreational catches in 2008. Fishermen caught 67,000 fish.

The creel limit will remain at eight fish per day in all North Carolina coastal waters. The flounder size limit will remain at 14 inches in the western rivers and sounds, and south of Browns Inlet.

The 15-inch size limit does not apply to commercial flounder catches. Commercial summer flounder harvest is managed under a separate ASMFC coast-wide commercial quota. For more information, contact DMF flounder biologist Chris Batsavage at 1-800-682-2632 or chris.batsavage@ncmail.net.


DUANE RAVER

NEW LIMIT | 15 INCHES

CALENDAR OF EVENTS

MONDAY–SUNDAY, JUNE 1–NOVEMBER 1

Explore how art and science work together in the artistic illustrations of birds in the exhibit "Birds: The Science of Illustration" at N.C. Arboretum in Asheville.
Visit www.ncarboretum.org.

SATURDAY, JUNE 6

Kick off National Fishing and Boating Week by taking a child fishing from 9 a.m. to noon at the Youth Fishing Rodeo at Strayhorn Pond between Hillsborough and Chapel Hill.
Call (919) 245-2660.

SATURDAY–SUNDAY, JUNE 6–13

Check out the 51st annual Big Rock Blue Marlin Tournament in Morehead City.
Call (252) 247-3575.
Visit www.thebigrock.com.

SATURDAY, JUNE 20

Enjoy a North Carolina tradition at the Great Smoky Mountain Trout Festival at the Maggie Valley Festival Grounds in Maggie Valley.
Visit www.gsmtroutfestival.org.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

New Fishing Opportunities at Pee Dee

Pee Dee National Wildlife Refuge visitors looking for a good place to go fishing should cast their lines in Sullivan's Pond this spring. The N.C. Wildlife Resources Commission and U.S. Fish and Wildlife Service recently partnered to establish the 2-acre impoundment as a public fishing area. The partnership led to the construction of a new fishing pier on the pond and scheduled stocking of catchable-sized channel catfish each spring to supplement the pond's existing population of largemouth bass, catfish and sunfish.

Another refuge impoundment, Arrowhead Lake, located about 5 miles from Sullivan's Pond, also was established as a new public fishing area, but anglers will have to wait at least until next year to catch fish. The 25-acre lake was drained in October to repair a dam and was refilled only recently.

To re-establish Arrowhead Lake's fish population, the Wildlife Commission is stocking fingerling largemouth bass, bluegills, redear sunfish and channel catfish. The first stocking was in March and consisted of 1,350 channel catfish. This fall, commission staff will stock the lake with nearly 10,000 bluegills and 4,000 redear sunfish, and early next spring, they will stock 1,300 largemouth bass.

Keith Hendrickson, a fisheries technician with the commission who spearheaded the project, said the fingerling channel catfish should be of catchable size by next spring, while the largemouth bass and sunfish fingerlings will take at least two years to grow to a size large enough for anglers to catch.

MELISSA McGAW / NCWRC

In addition to the fish stockings, two universally accessible fishing piers were built on the impoundments to make fishing accessible for everyone. The pier on Sullivan Pond is 59 feet long and 32 feet wide at the end, while the pier on Arrowhead is 75 feet long and 32 feet wide at the end. Both have benches and alternating high and low handrails with bait shelves that can accommodate children and anglers in wheelchairs.

Sullivan's Pond is open to fishing year-round while Arrowhead Lake is open to fishing only from March 15 to Nov. 24. The Pee Dee National Wildlife Refuge closes Arrowhead Lake to all public use from Nov. 25 to March 14 because it is located within the waterfowl sanctuary, where migratory bird species spend their winters.

Fishing in the entire refuge is by free permit only. Permits are available at the refuge office and at kiosks located around the refuge. No gas motorboats are allowed on either impoundment. Refuge operation hours are ½ hour before sunrise until ½ hour after sunset.

IN SEASON

This month, these seasons are open in North Carolina:

Crow:
Season runs from June 1, 2009, to Feb. 28, 2010.

Hatchery Supported Trout Waters:
Through Feb. 28, 2010.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2008–2009 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

The Wildlife Endowment Fund

~An Investment for the Future~

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses and lifetime magazine subscriptions is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appropriate block)*:

- ☐ Sportsman Infant $200
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Sportsman Youth $350
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check appropriate block)*:

- ☐ Comprehensive Inland Fishing. $250
  (N.C. residents only—includes basic inland fishing, trout & trout waters on game lands)
- ☐ Comprehensive Hunting. $250
  (N.C. residents only—includes basic hunting, big game, game lands & N.C. waterfowl)
- ☐ Sportsman. $500
  (N.C. residents only age 12 or older—includes basic hunting & inland fishing, big game, game lands, trout & N.C. waterfowl)
- ☐ Coastal Recreational Fishing $250
  (N.C. residents only—includes coastal recreational fishing)
- ☐ Unified Sportsman/Coastal Recreational Fishing $675
  (N.C. residents only—includes same privileges as the Sportsman, plus coastal recreational fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

- ☐ Copy of Prior Year Hunting License
- ☐ Copy of Hunter Safety Certificate of Competence
- ☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side *(please print legibly)*:

Name of Applicant _____

Daytime Phone _____

Mailing Address _____

Resident Address _____

County _____ Date of Birth _____ Driver License # _____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

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City _____ State _____ Zip _____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. # _____ Expires _____

Print name exactly as it appears on credit card _____

Cardholder's Signature _____ Date _____

Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: ___ ___ ___ ___ ___ ___

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:
___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Signature of Applicant or Donor _____ Date _____

Note: Only adult lifetime licenses may be purchased by phone or online (VISA or MasterCard only). Call toll-free (1-888-248-6834) or visit us at www.ncwildlife.org. Use this form to purchase infant and youth lifetime licenses by mail.

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☐ I wish to make a tax-deductible contribution to the Wildlife Endowment Fund. Enclosed is my check for $_____. *(Credit card payments cannot be accepted.)*

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Make checks payable to: *Wildlife Endowment Fund*

A service charge of up to $25 will be charged on any returned check. (N.C.G.S. 25-3-506)

Mail completed application and payment to:
NCWRC, License Section, 1707 Mail Service Center, Raleigh, NC 27699-1707

Office location: *NCSU Centennial Campus, 1751 Varsity Drive, Raleigh, N.C. 27606*
Telephone: 1-888-248-6834 (2HUNTFISH)

How Do Carp Feed?

written by Clyde Sorenson
illustrated by Jim Brown

CARP ARE DIFFICULT FISH TO CATCH — they're wary, and they have sensitive lips that readily detect foreign objects. But the way they feed also makes them hard to catch.

A carp feeds by sucking in a mouthful of bottom sediment and then blowing it back out; it then grabs any edible morsels from the subsequent silt cloud. This way, the fish swallows only the insects, crustaceans, snails and plant tubers it's after, and not a belly full of mud. It could also be spitting out your baited hook.

The carp uses molar-like pharyngeal teeth (actually modified parts of their gills) against a horny pad on the bottom of its skull to grind up hard food like snail shells and plant roots. It rapidly pumps its mouth to sort the edible stuff from the inedible on its gill rakers. Taste buds all over its gill rakers and mouth help it figure out what is what.

Most of the ecological damage attributed to carp is due to the way they eat. In the process of feeding, a carp suspends a great deal of sediment in the water, reducing light for plants. Rooting around in the sediment also dislodges vegetation, and the fish's excrement pumps excess nutrients back into the water column.

Bad Company

written by Jim Dean

It was so frustrating. We had traveled 2,000 miles to fish this river, but even though we got up earlier and earlier each morning, there were always two guys in our favorite spot. The same two guys. Worse, they fished only when they saw a rising trout, and mostly sat on the bank guarding their water. The grass on their side of the river looked like a buffalo wallow. But fishing etiquette gives angling rights to those who arrive first, so we tried unsuccessfully to wait them out. We hated those guys.

JIM DEAN

Better company: Eddie Pinkston (left) and Harry Bailes

A century earlier, the solution would have been to simply shoot the miserable squatters. It didn't help when we noticed that their truck had California plates. In much of the American West, locals do not overly cherish Californians, and we'd been coming here for 30 years (close enough for native entitlement, by our reckoning).

Finally, Cam Cantwell had had enough. He waded out to midstream. "Since you guys are just sitting there, I'm going to fish this run down below you," he declared. Ten minutes later, he hooked a big rainbow that jumped all over the pool, but as he tried to net it, it ran between his legs. He slung one leg in the air, pirouetted with a singular lack of grace and fell backwards. He landed the fish while sitting up to his armpits.

Everyone was laughing, including Cam. "Well done, sir," said our antagonists as they walked down the bank to offer their assistance. "Nice fish, too." Of course, brothers Tim and Steve Guest have been our great buddies ever since despite their unfortunate connection with the left coast, and we all now share that pool and many others.

Last year, Tim flew here to fish the South Holston and Watauga tailwaters with us. It was his first visit to the South, and when we floated down the Watauga, he remarked that he felt like one of the characters in "Deliverance." Naturally, we warned him that he'd better row faster because we could hear banjos. By the end of his visit, that cliché had morphed into a more insulting variation. "Hey, Tim, we hear banjos so we're going to pull in here just for you, ol' buddy."

It's funny how these things work out. Every hunter and fisherman is well aware of the old adage that "The guys in the next duck blind (or boat, or fishing hole) are no good." They're sky-busters, fish hogs, scofflaws and worse. It's a normal initial reaction thoroughly ingrained in these sports, and fed by a combination of competition, distrust and presumed ownership of any favorite spot. Yet, in truth, once we meet those suspicious people, they almost invariably turn out to be just like us—in other words, sterling folks.

"Once we meet those suspicious people, they almost invariably turn out to be just like us—in other words, sterling folks."

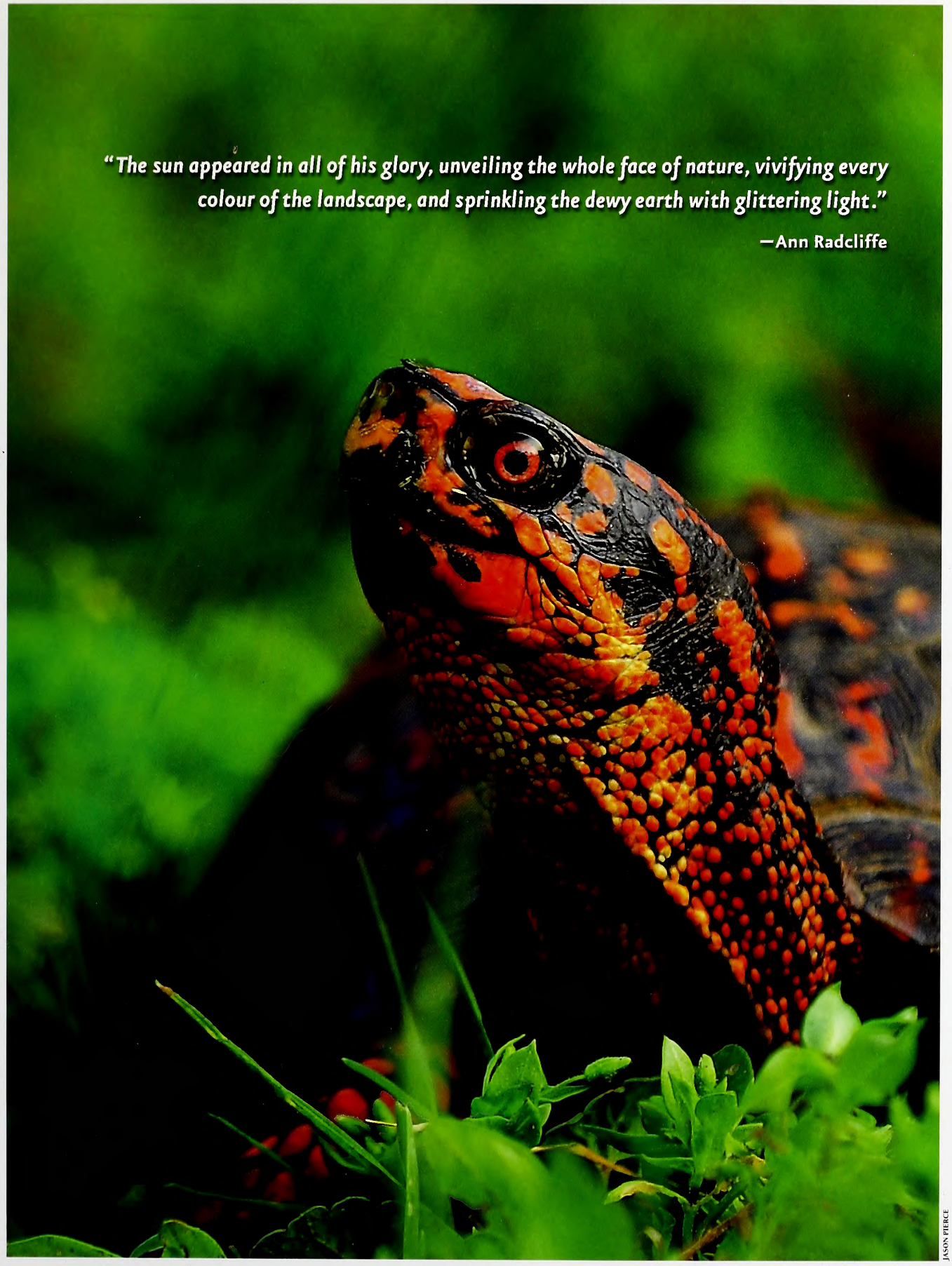
I am reminded of a sparkling October day in the marshes behind Cape Lookout when a friend and I passed two guys anchored in another boat in the Short Turn hole. They professed that they hadn't caught a thing, and began to pull in their anchor. We dropped our hook a decent interval from them anyway, and I soon noticed that they had apparently decided not to leave. After awhile, I noticed something else. They were catching trout, but every time they hooked one, they would sneakily ease it over the stern. When a boat passed, they would free-spool their line if they had a fish hooked or elaborately feign boredom and pretend to be leaving. These guys might be no good, but they were darn clever. We copied them shamelessly, sneaking fish into the boat, righteously denying any success to passing boats, and yawning while we reached for the anchor rope.

Pretty soon, we were in cahoots as thick as thieves. Before we left, we shared beers with our new buddies and laughed about the mutual deception that had kept our favorite hole from becoming overcrowded.

This past winter at Mattamuskeet when my brother John, son Scott and I had been in our blind for awhile, we observed that groups of ducks headed our way were occasionally intercepted by hunters in a blind 500 yards away. It didn't matter that we were also preshooting some of their ducks. Towards the end of shooting time, Scott crippled a wigeon that the wind was rapidly blowing beyond reach. He had to wade so far to catch it that he was a barely discernible dot on the horizon.

At the checkout, the guys who had been in the adjacent blind went out of their way to congratulate Scott. "Man, you're our hero," one said. "Never seen anyone go to that much trouble to retrieve a cripple."

Yet there was that hunt years ago when our guide took drunk, cranked up a portable radio loud enough to hear in Fairfield, and illegally left the blind to shoot ducks that had landed out of range. We were so disgusted that we left early. There's nothing worse than discovering that one of the guys in your own blind is no good.



JASON PIERCE

Eastern box turtle

OUTDOOR MOMENT

IN THE JULY ISSUE

KEN TAYLOR/NCWRC

ARBOREAL AMPHIBIANS
The calls of North Carolina's seven tree frogs dominate the night much of the year.

PEACE OF WATER
A fishing hole to call one's own often can provide much more than just quality angling.

CAST ABOUT
When wildlife and hurricanes meet, animals receive a stern test of their adaptability.

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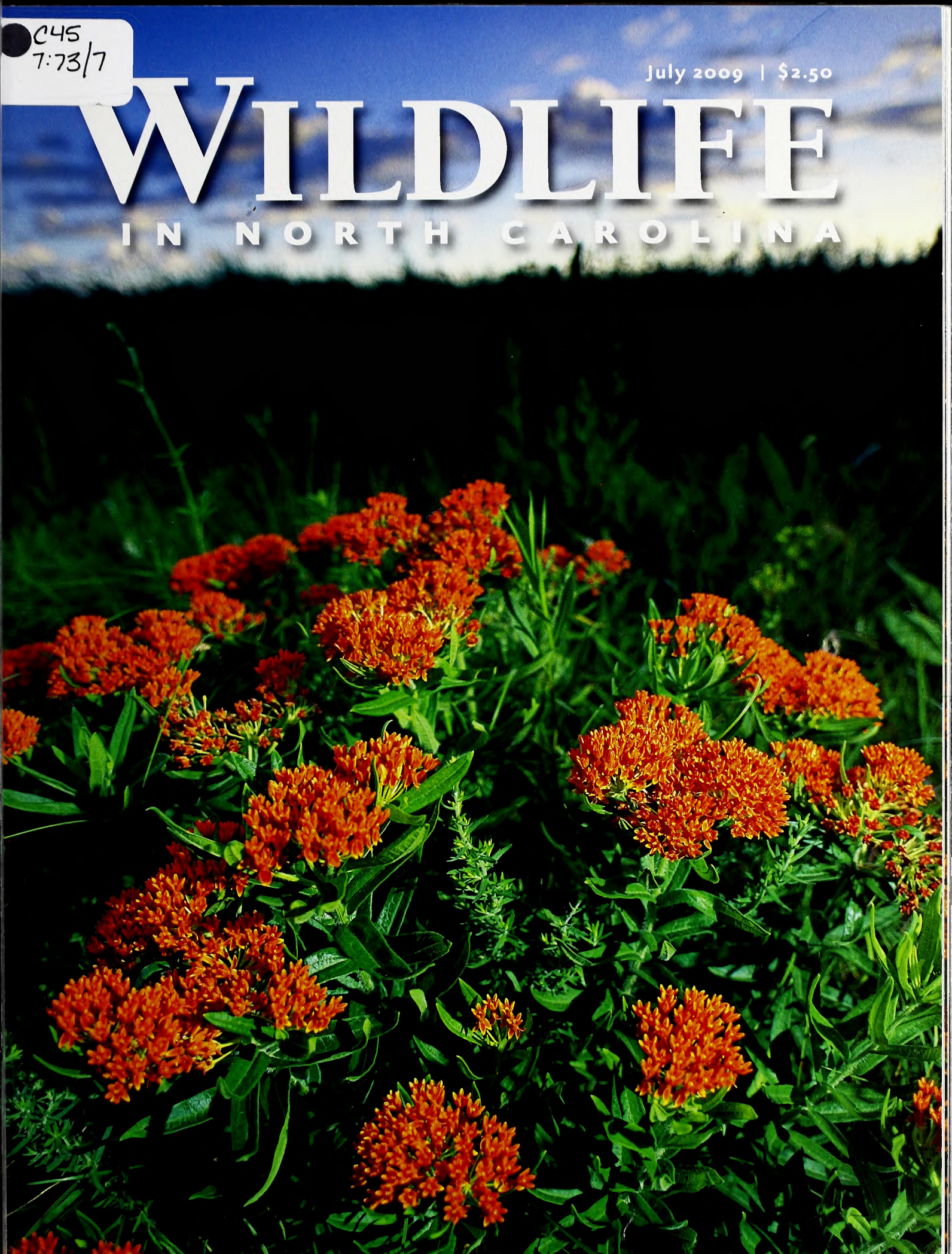
WILDLIFE IN NORTH CAROLINA



The squirrel treefrog is the smallest treefrog in the state and is so named for its scolding squirrel-like call.

PHOTOGRAPH BY TODD PUSSER.

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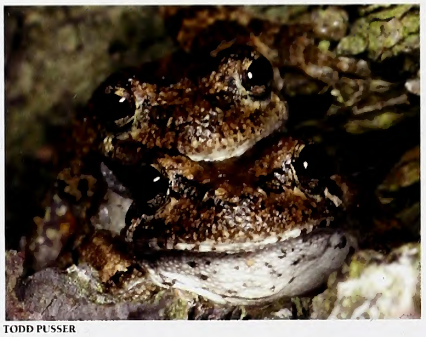
Cover: Butterfly weed's gorgeous blooms are both aesthetically pleasing and attractive to a large complement of insects.
PHOTOGRAPH BY JIM BRANDENBURG/MINDEN PICTURES.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

The word "home" means different things to different people. For some, it is simply the house where they keep their stuff. For other folks, it is the place where they grew up, perhaps the town in which their parents still live. For still others, home is more of a concept: They are looking for a place they connect with —somewhere that feels like home.



TODD PUSSER

Dave Lee lives in Bladen County now, but his story about his longtime Raleigh home ("Rethinking Lawns from the Ground Up," page 10) tells how he converted his once-manicured yard into a forest full of native plants. In reality, Dave's so-called "plan" was born out of a strong desire not to mow grass anymore, and it gradually morphed into tinkering with planting a few native species. His story provides quite a bit of food for thought. I have pondered it a lot this summer while mowing my own lawn (as mandated by my homeowner's association covenant).

Natural disasters can uproot homes of all kinds, including those of animals. Jay Barnes has written two books about hurricanes, and in "Creatures in the Storm" (page 4) he describes how North Carolina's storms destroy habitat and displace its denizens. The damage wrought upon the landscape by hurricanes often acts as a kind of giant scrub brush, scouring areas that will eventually regenerate the plant life they once held. Animals tend to cope with major storms by fleeing and then finding new homes once the storm is over.

Speaking of animals, plants and homes, treefrogs and butterfly weed are common things that many of us can find around our own homes. Butterfly weed might be blooming in the flower bed this month ("Visual Delights and Chemical Warfare," page 26) while a green treefrog feeds contently underneath your porch light, perched on your siding ("Frogs in Trees," page 14). A wise man once said that it's the little things that make a home.

The same goes for home waters, an angler's primary fishing hole. In "The Gift of Home Waters" (page 20), associate editor Jim Wilson leads us on a highly personal tour of his favorite piece of water, a little Piedmont stream bursting with panfish. But it's not only the good fishing that makes this stream Jim's home waters, he explains. It's how he feels when he's there—the solitude, the togetherness, the memories, the opportunity to clear one's mind, the connection. Just the way home should be.

Greg Jenkins

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JULY 2009 VOLUME 73, NUMBER 7

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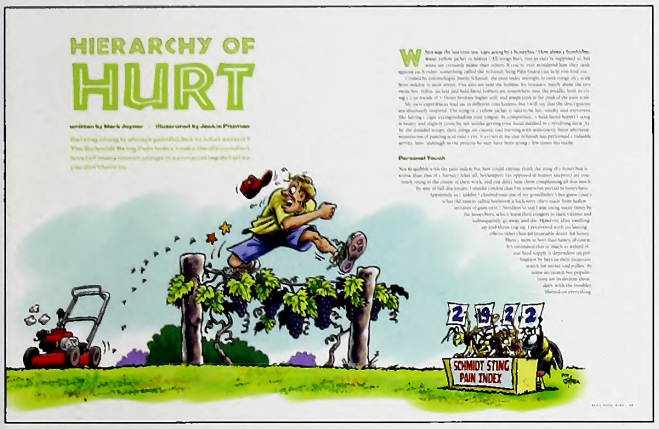

Smiling Through the Pain

While reading Mark Joyner's "Hierarchy of Hurt" (April 2009), I found myself laughing and remembering pain at the same time. I own an exterminating company and have had my share of stings. My scale of pain is different than the Schmidt Sting Pain Index. I find that yellow jackets cause more pain than most, but the pain is magnified by the number of stings received simultaneously. Whether on a tractor, lawn mower or just walking, I find yellow jackets able to cause sheer terror. We treat many yellow jacket nests in the course of summer and fall. This always occurs in the dark or in the rain to avoid agitating the insects. After treating many of these nests we will dig and remove the nest. The average size of a nest in the late summer is one foot across and looks much like a hornet's nest.

We once quoted a price to eliminate a nest, and the male half of the family was not willing to pay the fee. His wife called us the next day and said that her husband had poured gasoline in a nest immediately beside their backyard pool and lit the gas with a match. The pool side exploded and did thousands of dollars of damage. She was not impressed with his methods.

Hornets deserve respect and we certainly are careful when working with them. Bumblebees do seem to hurt the worst, but paper wasps bring surprise as well as pain. Honeybees are the group I find to be the easiest to work with. We make every effort to not eliminate honeybees, and we try to recommend removal as the first option. If this is not possible we make an appointment late in the evening and dutifully kill the bees. I have had hundreds of honeybees walking on me, and if not provoked, they do not sting.

The downside to a homeowner with a honeybee infestation is many pounds of honey that must be removed when the bees are relocated or killed. If the bees are not here to keep the honey cool, it becomes rancid and starts melting. This results in a foul odor and a horrible mess that has to be cleaned. This removal usually includes removing part of an interior wall or ceiling.

Jay Taylor
Wilmington

Double Inspiration

Congratulations and thank you for your April 2009 edition of *Wildlife in North Carolina*. As always, your magazine comes alive with informative and well-written articles about hunting, fishing and the bountiful natural resources we share in our state. This issue was a winner with two very interesting articles on turkey hunting. I enjoyed reading about new turkey tactics ("Gobblers for Beginners") along with the development of specialty shotguns used in this sport ("Scattergun Specificity"). As a result of these articles, I admit to hauling out my old camo gear and dusting off my turkey call in anticipation of a morning in the woods.

As I pondered which new turkey gun I "needed" to purchase, the phone rang with some exciting news. My grandson, a budding 6-year-old outdoorsman, had just taken his first turkey on a youth day hunt with his dad. The turkey weighed 24 pounds, 10 ounces, and sported a 11-inch beard. John T. harvested the bird with a single shot from his .410 youth gun at 12 yards. I am not sure who was most excited, but there were plenty of smiles to go around.

Upon reflection, I learned an important lesson from my son and grandson. You don't have to use the latest and greatest gear, nor do you have to be the most experienced hunter or fisherman to enjoy the outdoors. Given an opportunity, everyone has a chance to build a rewarding experience that could last a lifetime. Take a kid hunting or fishing—you never know what might happen.

Neal Conoley
Raleigh

Out, Darned Spots

I have fished the Yadkin River for smallmouth bass for a dozen years. Some of the content in your recent article on that fishery ("Angling Adventures on the Yadkin," April 2009) surprised me a bit. From personal experience I can state that as the number of spotted bass has increased in the past few years, the number of smallmouth bass has decreased.

To be honest, I wish the spotted bass had never been introduced into the Yadkin. They average only 8 to 10 inches in length and have seriously displaced both smallmouth and largemouth bass in that same river system. If there was some way to rid the Yadkin of spotted bass, I believe the fishery there for these other, larger species, would improve dramatically.

Robert J. Hale
Jamestown

Who Caught this Robin?

We incorrectly credited a photo of a redbreast sunfish on page 18 of the March 2009 issue in the article "The Moving-Water Sunfish." The image on the top left of the page was captured by Bruce Ingram.

We Want Your Feedback

Do you have a comment about content in *Wildlife in North Carolina?* Questions about something you read or have seen? Send us an e-mail at letters@ncwildlife.org. If you want fellow readers to know your opinion, this is the place. If you want an expert to answer your question, we will do our best to help. We hope to hear from you!

write us

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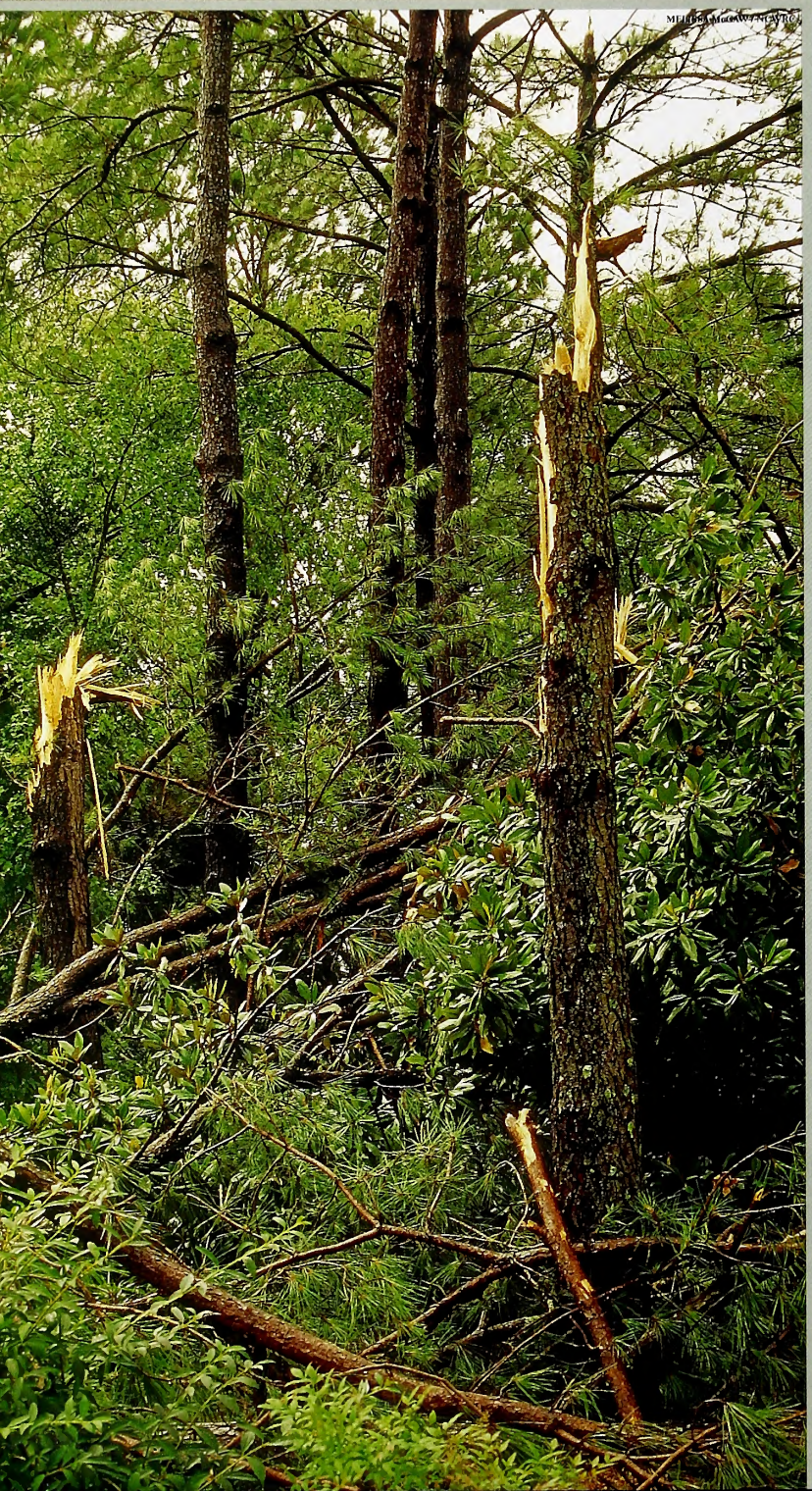
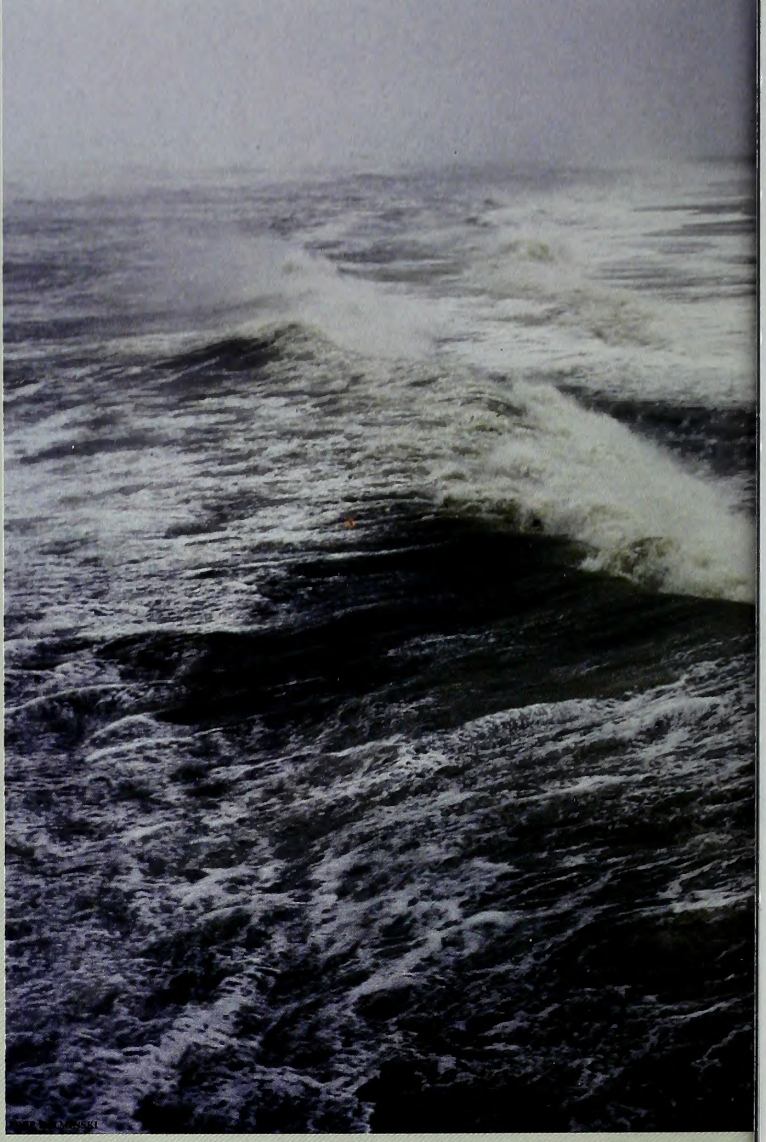
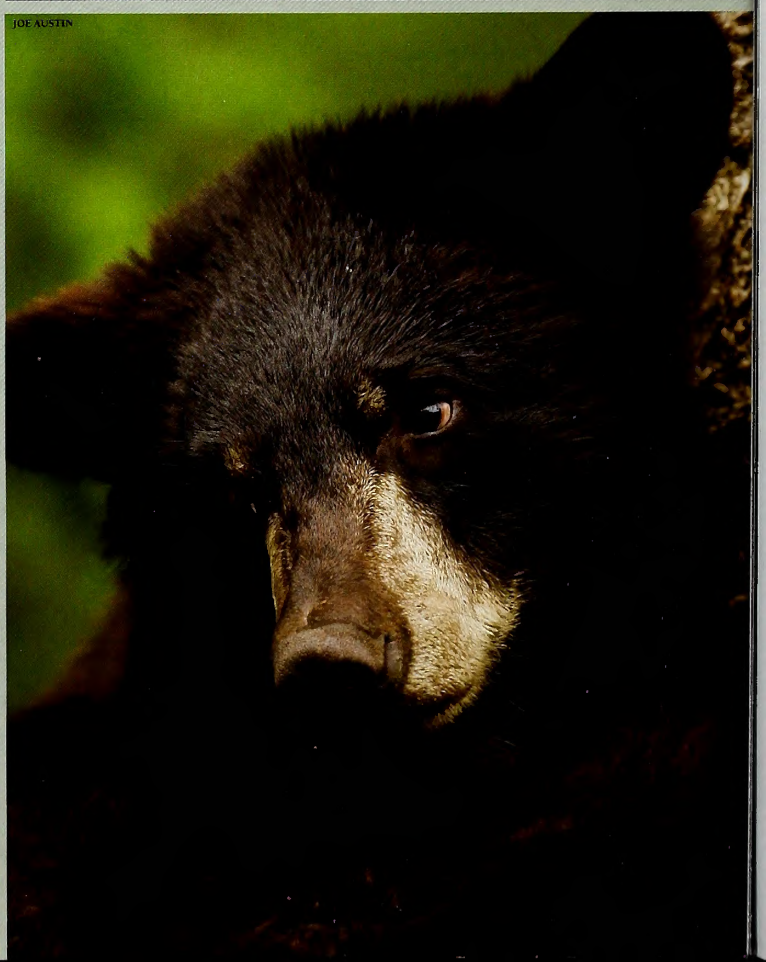






JOE AUSTIN

creatures IN THE STORM

Written By Jay Barnes

As Hurricane Donna tracked toward the Carolina coast in September 1960, a large flock of seagulls became trapped inside the storm's eye. Military radar confirmed the presence of the birds, which were carried hundreds of miles northward by the storm. Many of the exhausted flock finally escaped over Cape Fear when the eye expanded to 60 miles in diameter, just before the Category 3 hurricane struck Morehead City. But hundreds of dead gulls washed up on North Carolina beaches in the days that followed.

After Hurricane Fran in 1996, birdwatchers in Raleigh were treated to a rare sight—hundreds of seabirds around the city. As the storm pushed inland, it carried with it a collection of birds usually found over the Gulf Stream, including petrels and an Audubon shearwater. Wildlife experts reported that the variety and quantity of seabirds found at Jordan Lake on the Saturday after the storm was unprecedented.

Warning Signs

Scattered throughout our long hurricane history are these and many other intriguing reports of how hurricanes have affected animals—both in the wild and around the house. On land, at sea and in the air, these creatures are in many ways just as vulnerable to hurricanes as humans. We know that large and powerful storms flood homes and businesses, down trees and power lines, and thrash man-made structures in their paths. But they also batter islands, marshes, rivers and forests and put their inhabitants to the test. Harsh storm conditions flood burrows, wreck nests and in extreme cases reorder the natural ecology of the hardest-hit regions.

Through millions of years of coping with tropical cyclones, species survival has required adaptive behavior on the part of wildlife—from the largest predators to the smallest prey. Much like their human counterparts, most animals seem to react instinctively to approaching storms, by either fleeing or hunkering down. Different habitats present different challenges for the life within them, and not surprisingly, some species fare better than others during violent storms. Some of their stories are gathered here and offer a mostly anecdotal view of how animals endure great hurricanes and floods.

> Although everyone is aware of the effects of major storms on people and property, it is all too easy to overlook the equally pervasive impact—both positive and negative—they can have on the wildlife of the state.

Tales have been recounted of animals foretelling severe weather. Cats, birds and livestock have long been described as "natural barometers" for predicting hurricanes. In his book "Violent Storms," Jon Erickson described some of the indications such as "ducks quacking ... horses shying, goats butting, cattle and sheep leaving hilltops for lower ground, crows cawing more than usual, and donkeys making a ruckus.

The effects of severe weather in the state are far reaching and significant, with storm damage affecting habitat of animals ranging from loons at the coast to black bears in the mountains.

TODD PUSSER

LARRY EARLEY / NCWRC

The type of severe flooding witnessed during Hurricane Floyd (above), can drive snakes such as this brown water snake (top) into trees to avoid the rising waters. Hurricanes also can kill birds (opposite page) and cause large fish kills. Other impacts can be the displacement of mammals farther inland.

Movements of birds and fish have long been observed in advance of major storms. After an August hurricane in 1881, the army's chief signal officer for Carteret County wrote in his annual report:

> *Morehead City, N.C., 24th, over thirty hours in advance of the storm, the skies became blackened with seabirds of every kind, size, color and description, moving rapidly toward the west, as if fleeing from the violence of the coming storm. The strange conduct of the birds was equaled, if not surpassed by the finny tribes, as shown by the latter's rapid flight up Newport River, a narrow, turbid stream. All through the day the fish, in schools of millions, passed up the stream, followed by great droves of porpoise, so thick that the river looked like a slowly moving stream of ink.*
>
> *27th, birds slowly returning, at Newport, where the stream is very narrow, the fishes and porpoise were so wedged in that they could not move either up or down. The above incident would appear to give evidence of the possession of a wonderful instinct by birds and fishes.*

Along the immediate coast, land-falling hurricanes often decimate the nests of sea turtles lying in shallow sands on the upper edges of the beach. Loggerhead and green sea turtles, both federally protected species, lay their eggs during the warm summer months. The nests' eggs hatch out sometime between August and October—the very peak of hurricane season. Higher-than-normal tides and churning waves can undermine and wash away the nests.

Hurricanes Bertha and Fran were particularly destructive to the nesting population in North Carolina, wiping out at least 230 nests in 1996. Hundreds more were destroyed during Dennis and Floyd in 1999 and Isabel in 2003. Most of the losses were on beaches south of Cape Hatteras, where sea turtle nests are more common.

New Tenants

Freshwater and marine fish populations are also imperiled by hurricanes. Commercial fisheries usually suffer, especially harvests of oysters and shrimp. Seasonal harvests of white and brown shrimp can be wiped out if surging tides and excessive rains prematurely wash young shrimp away from coastal feeding habitat. And heavy rainfall in coastal areas produces bacterial runoff, forcing the closing of shellfish waters near the shore. After most hurricanes, state fisheries agents survey the storms' impact on commercial species.

Soon after Fran struck North Carolina, large fish kills were reported in several eastern rivers and streams. Most of the kills were the result of lowered oxygen levels caused by tremendous quantities of leaves, limbs, sediment and other organic matter that washed into the water. In some areas, fish kills resulted from wedges of salt water that were pushed upriver by abnormally high tides.

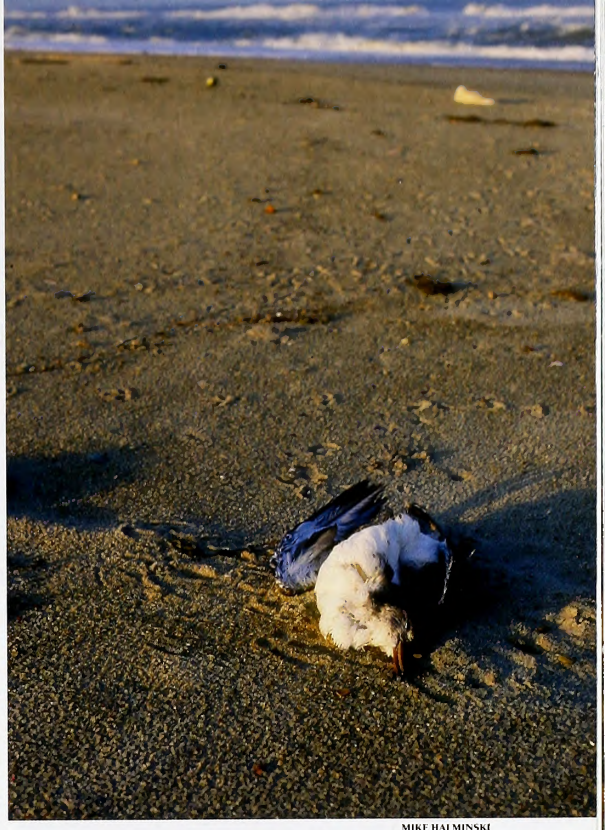
But not all the fish in the rivers perished. In the days following Fran, wildlife biologists reported a mass exodus of fish down the Neuse River. The fish hugged the shore and moved swiftly ahead of a surge of dead water. And biologists note that downed trees and broken limbs that fall into rivers, lakes and streams could, in the long run, actually help fish populations increase. The fallen branches improve fish habitat by providing shelter for many freshwater species.

Urgent migrations also saved countless fish across eastern North Carolina during the record floods of Hurricane Floyd in 1999. Though everyone expected the worst, biologists who monitored the health of the state's rivers and sounds found that the unprecedented flood produced a flushing effect, and few fish kills were reported. In the months after Floyd, commercial fisheries fared well too. Some coastal fishermen reported record catches for the year, though state officials had predicted millions in losses.

Storm tides and churning seas have yielded some amazing fish tales along the Tar Heel coast. After Donna passed through Manteo in 1960, flopping bass and other live fish were picked up off the streets and prepared for dinner by local residents. When Hurricane Hazel's storm surge retreated in 1954, a large flounder was found on a sidewalk in Carolina Beach. And a sailfish, more commonly found offshore in the Gulf Stream, was caught and released in the surf at Atlantic Beach as Hurricane Emily approached in 1993.

On more than one occasion, flooded Ocracoke residents have found fish lurking in their furniture and blue crabs hiding in their closets. Old-timers there installed trapdoors in their floors to allow storm tides to wash through their living quarters, preventing their homes from floating away. Rising tides routinely deposit a broad variety of marine life before quickly receding.

SCOTT TAYLOR



MIKE HALMINSKI

Different habitats present different challenges for the life within them, and not surprisingly, some species fare better than others during violent storms.

JOE AUSTIN

After Fran damaged or destroyed more than 8 million acres of North Carolina forest in 1996, no creature was more severely affected than the red-cockaded woodpecker.

TODD PUSSER

The Bad and the Good

Some hurricanes skirt the coast, but others barrel inland, wrecking forests, farms and cities many miles from the shore. Powerful winds from extreme storms such as Hazel, Hugo and Fran have a devastating effect on forest habitat. In addition to the obvious destruction of nests, the widespread loss of acorn-producing oaks has a long-term effect on squirrels and other species that depend on the hard mast crop for food.

After Fran damaged or destroyed more than 8 million acres of North Carolina forest in 1996, no creature was more severely affected than the red-cockaded woodpecker. These endangered birds take months or even years to build cavity nests in mature pines, and Fran's gusts snapped the trees right at the cavities—a natural weak spot. In the months following the storm, wildlife biologists worked to re-establish nests by cutting holes in younger pines and installing artificial nesting cavities. Other animals that nest in trees, including chickadees, wrens, eagles, owls, raccoons and squirrels, were also among Fran's casualties. Most vulnerable were their young, many of which were either killed or orphaned by the storm.

But not all wildlife populations are harmed by forest-wrecking hurricanes. Though some animals are hit hard, most manage to escape without harm. During Hugo in 1989, some South Carolina forests were leveled by winds of up to 135 mph. Over 6 billion board feet of timber was destroyed. Large animals such as deer and bear suffered some losses, but many species actually benefited afterward due to the increased browse created by shrubs and herbs that flourished where trees were knocked down. The same was true in North Carolina after Fran.

"The fact that trees were blown down across various woodlands will stimulate seed-producing plants, which will in turn benefit some small game, birds and deer," wildlife biologist Carl Betsill said at the time. Many early successional forest species such as rabbits, bobwhite quail, snakes and songbirds benefited from the excellent shelter created by the thick, tangled web of new growth and fallen trees.

Torrent of Risk

Hurricane floods often flush out snakes, rats and other animals, creating potential hazards for humans who themselves must scramble to high ground. Snake sightings are particularly common during major flooding events. After Floyd, desperate residents in Pitt and Edgecombe counties were forced to climb into treetops to avoid rapidly rising waters, only to find branches wrapped with copperheads and other serpents. In Carteret County there were similar reports of snakes in trees after an unnamed hurricane in 1933. After a hurricane in 1876, a Hyde County man found a rattlesnake coiled inside his dresser drawer. These invading reptiles were chased by floodwaters and were merely seeking dry locations to ride out the storm.

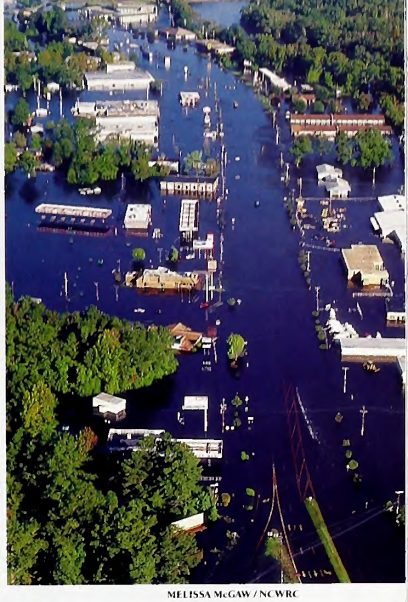
Following Floyd, a Greenville man packed all of his possessions into an oversized duffel bag as he prepared to abandon his flooded mobile home. He didn't realize that a large water snake had crawled into his bag while he awaited rescue by local volunteer firemen. When their small boat arrived, he climbed aboard with several neighbors for the short ride to high ground. But as they motored across a flooded roadway, the snake crawled out of his bag and into the bottom of the boat, creating a brief chaos that the evacuees and firemen would not soon forget.

Swarms of displaced bees, wasps and fire ants are another potential hazard during floods. Fire ants were particularly troublesome after Floyd. Relief workers such as National Guardsman Chris Hackney saw plenty of them in his work around Kinston. "You'd see big piles of stuff floating on the water that you thought was just a log," remembers Hackney. "When you'd get to it, you'd see fire ants stacked up on top of one another, floating in the water. As long as you left them alone, you were all right. But if you took a stick and just touched them with it, they would just—whoosh!—all over you."

The Other Victims

For hundreds of years, stretches of North Carolina's Outer Banks have provided haven for feral horses. These hardy creatures have endured the ravages of hurricanes, but storms

MELISSA McGAW / NCWRC



MELISSA McGAW / NCWRC

As a result of extensive flooding during Hurricane Floyd, dangerous knots of fire ants floated on the water (above left). After Hurricane Fran destroyed vast areas of habitat for the red-cockaded woodpecker (opposite page), wildlife biologists worked to create artificial nesting cavities for the displaced birds.

have thinned their numbers on several occasions. During the powerful San Ciriaco hurricane of 1899, hundreds of "banker ponies" and scores of cows and goats drowned near Cape Lookout. So many were reportedly lost that burning their carcasses became the only effective means of eliminating a potential health hazard on the banks.

During Fran, thousands of trees toppled into pastures across eastern North Carolina, sometimes striking and killing horses and livestock. But some trees proved even more lethal in the days following the storm, when horses that munched on the wilted leaves of fallen red maple, cherry or elderberry branches became sick and died. Cherry leaves contain cyanide, and the leaves of all three species are toxic to horses and often lethal. The staff of N.C. State University's College of Veterinary Medicine scrambled to save what animals they could and issued warnings to horse owners to remove the downed trees as quickly as possible.

Another of the flood's great tragedies was its impact on pets. The number of deaths is unknown, but more than 1,000 dogs and cats were rescued from abandoned homes in the first week after the storm. Many were reunited with their masters, but in the chaos of the disaster, some could not be matched with their owners. Many were sick or injured and needed immediate treatment. Teams of veterinarians converged on N.C. State University in Raleigh, and an animal field hospital was set up behind the N.C. Museum of Art. At one time more than 80 cats and dogs were housed and treated in the facility.

At the same time in Burgaw, a major animal rescue effort was led by veterinarian Cynthia Burnett and her husband, Buster Leverette. With the help of friends, they worked around the clock, often risking their own lives to save hundreds of dogs, cats, horses, hogs, cows and other animals from flooded homes in the Pender County area. Their veterinary hospital later became a hub for rescue operations, ultimately housing more than 350 animals.

"I didn't have any keys to these houses, so I had no option but to kick their doors in," Leverette remembers. "Every animal that we picked up was happy to be on the boat. They didn't care if they were cats with dogs, dogs with chickens, chickens with goats and pigs. They didn't care." Leverette remembers one stirring rescue: "I found a German shepherd that had been chained to a tree, and it had figured out a way to get up on this deck. But only his ears and nose [were] sticking out of the water, and the chain was pulled just as tight as he could. I mean he almost drowned himself barking to get our attention."

During Fran, Al's Auto Salvage in New Bern was guarded by Petey, a junkyard dog all of 10 inches tall. Skip Crayton, owner of the shop, gave him that name because of his resemblance to the mascot on the television show "The Little Rascals." On the night after Fran roared through, floodwater inside the garage rose 16 inches above the floor. The following morning, Crayton opened the door and out came Petey — covered up to his neck with mud and oil. Crayton reasoned that the determined little dog must have swum for six to eight hours continuously, keeping his head just above water to stay alive. Petey then slept for two days.

The Same as Always

When any major hurricane strikes land, our focus is necessarily placed on the lives and properties of the storm's human victims. But when a big one hits, we can also expect that entire forests may be leveled, rivers purged and habitats reordered. Hurricanes reshuffle the deck throughout the natural world, testing the endurance and adaptability of all creatures in their path. As they have for millions of years, most species recover quite nicely. ◆

JOE AUSTIN

Jay Barnes is director of the N.C. Aquarium at Pine Knoll Shores, author of "North Carolina's Hurricane History" and an occasional contributor to Wildlife in North Carolina.

Rethinking Lawns

written by David S. Lee photographed by Melissa McGaw

from the Ground Up

It's a fact that many manicured lawns are anything but "green." Societal values might not have shifted yet, but the advantages of letting your yard revert to a natural state make a compelling argument for going wild.

I remember mowing lawns when I was a teenager. At first we had only a push mower, but eventually I learned that if I mowed the neighbors' lawn too, I could use their riding mower. Eventually we got our own power mower, but by then the pattern was set—my neighbors' yard was now part of my program.

I always saw lawn care as little more than an interruption of an otherwise good summer weekend. Then there was dandelion pulling and trimming off the grass that insisted on growing over the edges of sidewalks and curbs and into my mother's flower beds. In the fall I got to rake leaves before mowing the yards. The combined lawn chores made me look forward to winter. Eventually, my departure for college forced my parents to hire a professional gardener.

When my wife and I purchased our house north of Raleigh, the 3-acre lot was mostly wooded, but the previous owners had a small lawn of a quarter acre or so around the house, and the manicured grass extended out in various directions into the woods. In the storage building they left me an almost-new push mower. A few weeks after moving in I reluctantly mowed the grass, but one time was enough. By late summer the grass, and the assorted other green leafy vegetation that was now growing among it, reached a foot high in places. By fall some of this vegetation was in flower. A bizarre combination of native plants, exotic weeds, and native and non-native grasses took hold. Many of the grasses were in bloom, too.

A carpet of brown leaves began to cover the lawn. The grasses and most other plants turned brown, too. Snow and ice matted everything flat, and twigs and limbs broken free by winter ice storms littered the yard. By the following summer the grass survived in patches of different sizes, and new plants were invading everywhere. Small woody plants, vines and saplings parented by nearby trees sprouted in an unorganized invasion that seemed to fit well with my master plan.

By the third year I decided to help the process along. Where exotic weeds took hold, I rooted them out and in their place planted native woodland ferns and wildflowers. Sapling trees grew quickly in the unshaded portion of the yard where the lawn previously existed. With the fallen twigs and limbs left in place, the leaves did not blow about, and by year four everything looked like a natural woodland floor.

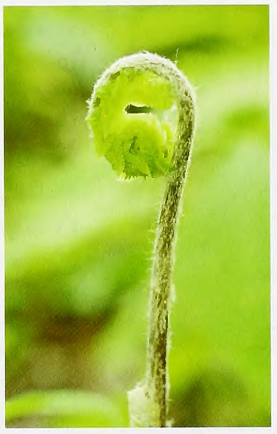
Today, more than 30 years later, there is no trace of the original lawn. We live in the woods. With a savings of five or six hours a week free from lawn duty over the last 30 years, I estimate I saved more than 300 hours a year, or so far about a year of my life. Extra time to enjoy the March blooming of bloodroot and trout lilies, to pause and watch a box turtle eating a mushroom from the reclaimed forest floor, and to make a catalogue of the different types of ferns now growing in our yard.

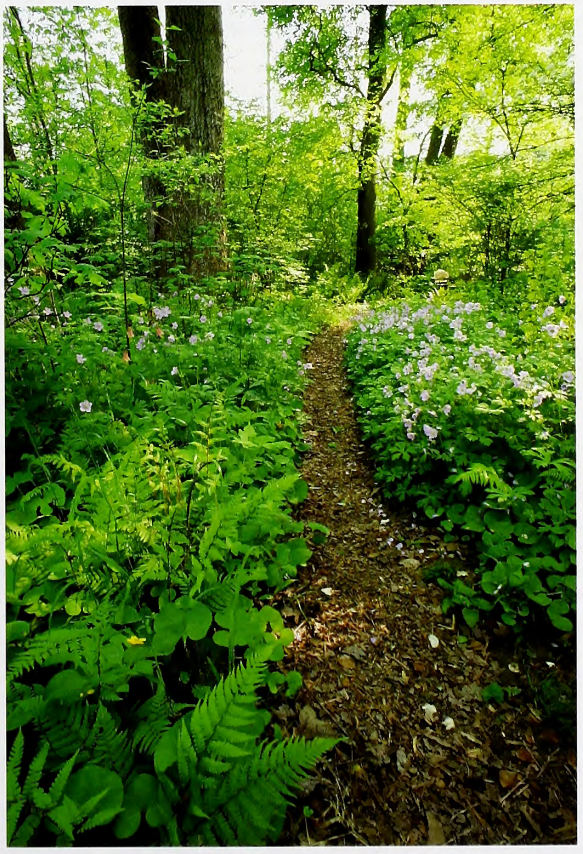
Fighting nature

A trip to a hardware or lawn-and-garden store is an eye-opener. Apparently, most people are quite intolerant of other living things sharing their space. In addition to the standard-issue mouse- and rattraps, there are mole traps, squirrel repellent, mesh to keep birds out of fruit trees, snake repellent, models of owls to scare birds away, weed killers, herbicides, ant poisons, vole baits, yellow jacket traps, bug zappers and live traps for raccoons, possums, skunks and other vermin. It is hard to think of any plant or animal for which there is not some commercial product to counter it. Yet, often in the same stores one can find bird feeders, bat houses and even homes for butterflies.

When I was working at the N.C. Museum of Natural Sciences, I got calls from people wanting to know how to get rid of bats living behind their shutters or swifts in their chimney, and the next call might be from folks asking how to get bats to move into their new bat house or why they can't attract purple martins. Although no one needs a family of rabid raccoons living in the

Ferns and native wildflowers such as columbine can help transform a manicured lawn into a lush natural area.





KEVIN ADAMS

Colors pop in a natural yard with flowering native plants such as the yellow lady's slipper orchid (top) and green and gold. Eastern box turtles could find habitat there.

attic, in most cases it does little harm to share your property with indigenous wildlife, and many of us find it enriching.

Think of all the lawns in just your county, and imagine the wide array of native plants and native creatures that would come to use that space if it were allowed to revert to a more natural landscape. Of course, a few new nuisance animals would move in, but probably not many more than currently terrorize your grass.

My wife enjoys planting this and that in a few special places around the house. At first I worried that some of these plants would naturalize and run amuck. There was little need to worry. Between the shading of the trees, leaf-chomping insects, browsing deer and summer droughts, few of her plants even made it into their second season. Most of those that have survived have been stunted by the competitive, preadapted native vegetation.

Most people don't understand the basics of grasses. They become alarmed about every little thing and feel they need to fix their lawns. The yellow pages are full of companies specializing in lawn care and lawn doctoring, like it's some aloof form of science. Lawn owners panic when patches of brown, dead grass appear, not realizing that some grasses are annuals, with the parent plants dying back before the next year's crop germinates. They poison the ground with chemicals to kill off imaginary creatures that are eating the grass' rhizomes. The grass grows back, and because the system obviously worked, the spots are poisoned again next year.

At the heart of all this is the nature of grass itself. Grasses and sedges grow from their base, unlike woody trees and shrubs, vines and most herbaceous species, which grow from their tips outward and upward. Grasses are stimulated by grazing, fire and, in our modern age, mowing. In fact, grasses carry the process one step further. The dried leaves of some species of grasses contribute key fuel loads to both local and vast burnings, and other grasses concentrate nutrients into their leaves to support grazing animals. They grow in ways that encourage continual grazing and nibbling, which stimulate new growth. The same grazing animals in turn destroy most woody vegetation as they continually prune the growing tips of the plants. For a grassland community—whether a lawn, an isolated wet meadow or a vast prairie—to survive, fire, grazing or mowing is necessary. Stop mowing your lawn for three years and you will understand my point.

Benefits of a natural yard

Lest this all sounds too radical, let's go over some really positive benefits of going lawnless. If that is too big a step, you could at least consider letting a major portion of your property return to a more natural state. If you like the results of that, you can gradually expand your natural garden. The advantages for native wildlife are obvious, but there are many practical aspects to doing away with or reducing the lawn area that may not be immediately apparent.

Without mowing, chemicals and poisons, native wildlife will appear. Fowler's toads, ground skinks and worm snakes move in, and shortly behind them come the red-shouldered hawks that feed on them. The songs of wood thrushes replace the incessant chirps of the displaced starlings and house sparrows. Many exotic species find they cannot make a living once the artificially maintained landscape is no longer present. I have not seen either of these introduced birds in our yard since it went native. Butterflies, treefrogs and flying squirrels all take up residence, and the summer songs of snowy tree crickets fill the night.

Whether it's the flickering of fireflies or the new array of birds, the change is obvious. For those already in tune with the outdoors, life is richer. But you don't need to be Henry David Thoreau to appreciate Carolina wrens or the caterpillar of a hickory horned devil. Instead of worrying about grubs under your lawn, you can smile at the thought of slimy salamanders secure under a rotting log, or the five-note hooting of barred owls nesting in your backyard. The rewards for replacement of your monotonous, high-maintenance, two-dimensional yard come in many forms, including reflections of a youth misspent mowing lawns.

Dead trees and limbs, unless they are a threat to structures or power lines, can be left in place. They attract woodpeckers and other cavity-nesting birds, and the abandoned cavities in turn will house any number of interesting tenants. Bizarre beetles with long antennae live beneath the decaying bark, and the red-bellied woodpeckers that once drove you mad drumming on your garage siding are now happy advertising their presence by hammering endlessly on a dead limb.

Air quality improves with an increase in the volume of vegetation. A small forest of trees is a carbon dioxide recycling center, and expansive forests, even ones with houses nestled among them, contribute to a balanced atmosphere for our planet.

Water conservation is becoming a big issue in many areas, and doing away with lawns conserves water in two ways. First, the need to water lawns endlessly during dry spells in the summer is no longer a factor. The second point, however, is the important one. A leaf-covered woodland floor absorbs excessive rain. Runoff becomes all but nonexistent, allowing reserves of groundwater to recharge. Runoff also washes pesticides and fertilizers applied to lawns into our streams and rivers, so its reduction is important for local aquatic systems.

The extra shade provided by trees in your yard, and the buffering of winds by shrubs and other intermediate-height vegetation, will cut back considerably on home heating and cooling costs.

Taller woody vegetation provides a soothing visual barrier from what surrounds your property, and it also helps to screen out

annoying sounds such as the noise of the neighbors' lawn mowers cranking up on Saturday morning.

The creatures and weeds that were considered lawn pests disappear because of the lack of grass and sun, and others that remain are no longer in the pest category because there is no longer a lawn for them to destroy. Mole runs under the leaf litter are not something to be concerned about, and fire ants and dandelions disappear because they can no longer survive in the shaded landscape.

The advantages of cost and time saved from weekly lawn duty are easily calculated. The only challenge will be finding ways to squander your newfound free time.

Appreciating nature

Learn to appreciate nature and seasons. When you attain a yard with native plants, the plants care for themselves. If you don't have a rose garden, you won't spend time killing Japanese beetles. In your free time you can learn about the guard hairs on the leaves of lady's slippers and how they prevent these native orchids from being eaten by insects, slugs and deer. The knowledge will make you appreciate these and other native orchids all the more.

Watch for the distinctive flickering patterns of backyard fireflies. Each species has its own signals, flying height and season to help eliminate confusion in finding the right mates. The back porch light will attract not only a variety of interesting woodland insects but also treefrogs and swooping bats, which see the light as a feeding station.

It is interesting how quickly people are accepted into the natural world, and intriguing to try to second-guess why the reverse is such a difficult step for most people. Many families strive for squeaky-clean, sanitized living space with a protective barrier of weed- and pest-free lawn. Then, to get away from the boredom of it all, they pack up and go camping.

Many local ordinances and regulations regarding communities' yards and lawns would benefit from revision. Perhaps tax adjustments based on ecological sustainability are in order. Start small: Expand wooded and natural areas into the grassy areas. Increase the size of flower beds by planting them with native species that are already adapted to local climate conditions. Phone lines and power lines may need to go underground to prevent power outages caused by storms as the woody vegetation increases and portions of neighborhoods are reclaimed by forest.

I know that those who obsess over their near-perfect green lawns are likely to panic and run over their mailboxes with their riding mowers at the very thought of a natural yard. It's just something to consider. But for a modern, environmentally conscious society, a "green" lifestyle is not actually about the color. Maybe ridding yourself of lawn duty will give you a few free hours each week to do something you enjoy—such as spending some quality time in your yard. ◆

Regular contributor David S. Lee is director of the Tortoise Reserve, an international turtle conservation organization.

How to go natural

There are many resources available for those who want to plant native vegetation or simply manage their property in a natural way. Here are few places to begin.

Hometown help. Many cities and towns statewide provide incentives, programs or advice for people who reduce the size of their lawn, replace it with warm-season grasses or use water-saving measures such as rain barrels. Check your municipality's Web site or call the town office for available options.

Extending a hand. N.C. Cooperative Extension offers tons of information on environmental stewardship on its Web site, www.ces.ncsu.edu. There or in the phone book you can find contact information for your county extension agent, who can provide help in person. Extension agents are posted in all 100 counties and the Cherokee reservation.

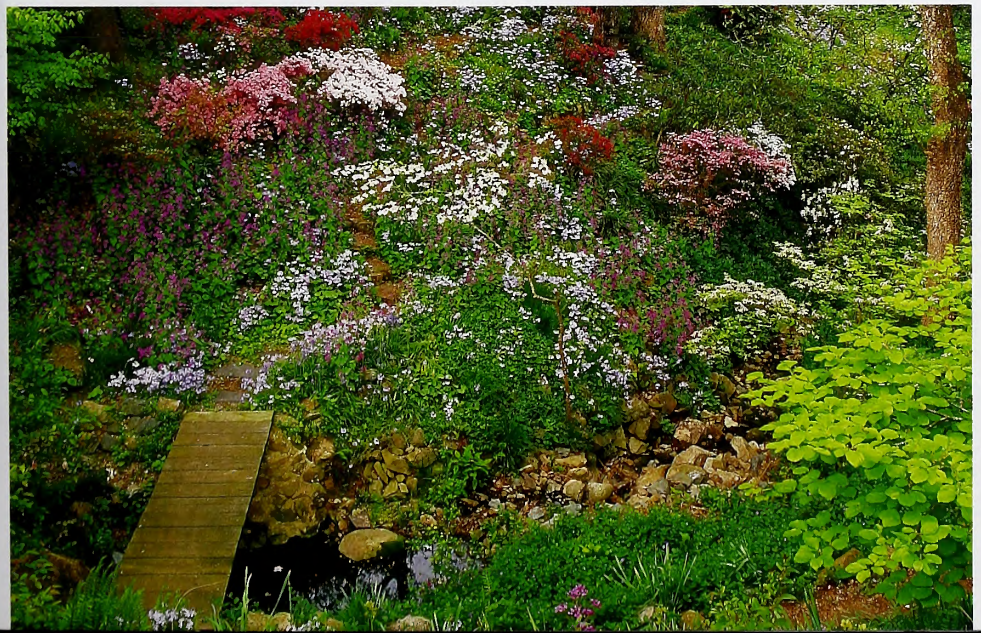
Society guidelines. The N.C. Native Plant Society offers a plethora of resources, including certification, outings, a speaker's bureau and the "North Carolina Native Plant Propagation Handbook." Visit them online at www.ncwildflower.org to learn more or find one of the eight statewide chapters. Visit them in person at the N.C. Botanical Garden's Totten Center in Chapel Hill.

Surf the Web. Sites such as www.plantnative.org offer directories of regional plants and native plant nurseries. At www.enature.com/native_invasive, you can find a native gardening guide and database of native North Carolina plants. There are dozens of gardening sites online, many of them with information about native plants.

KEVIN ADAMS

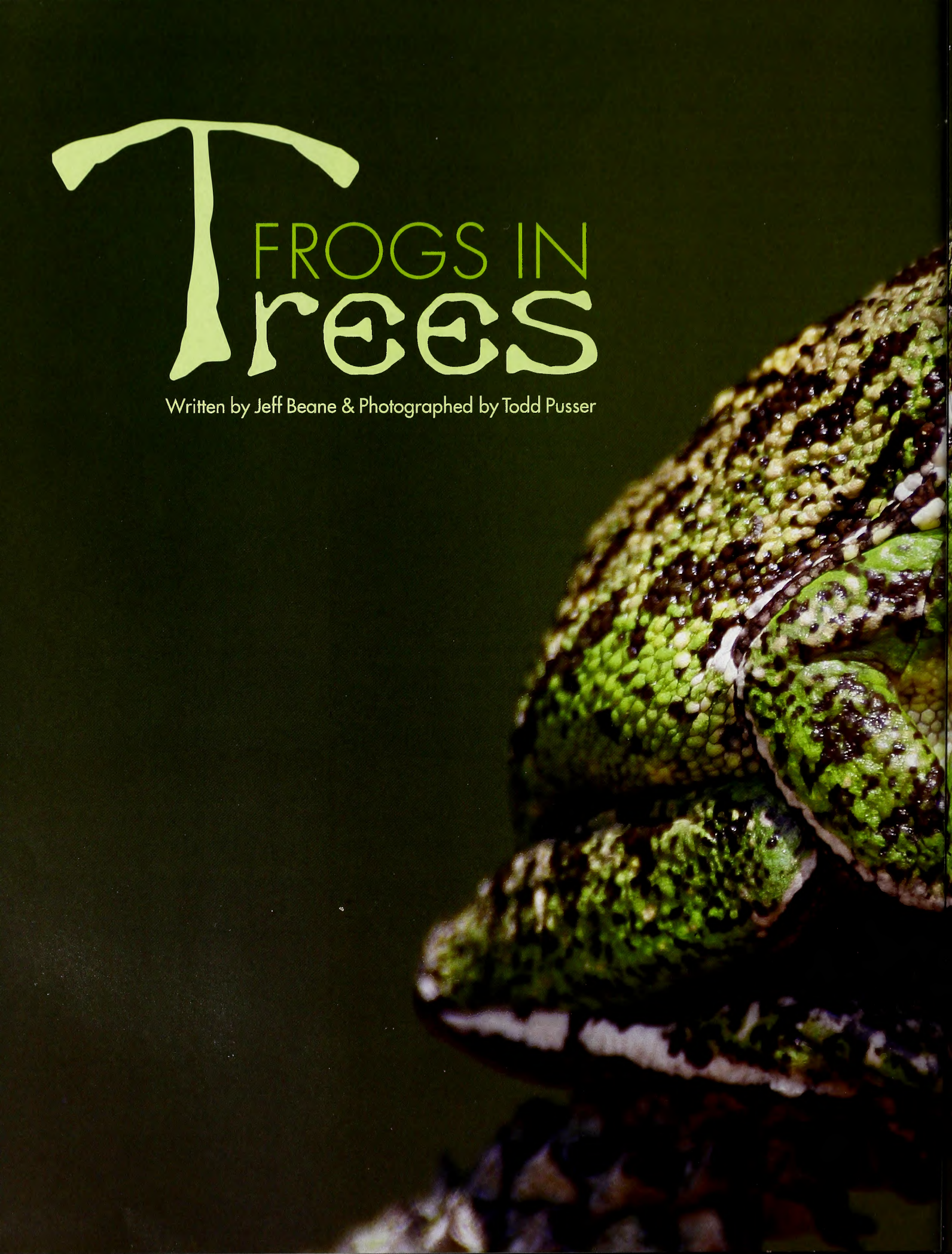
MASLOWSKI PRODUCTIONS

Bloodroot (right) and ferns will sometimes "volunteer"— that is, simply show up — in a natural area. A showy yard might require a homeowner to help nature a bit by planting flowering native plants. This might even attract wildlife such as the Carolina wren.



FROGS IN Trees

Written by Jeff Beane & Photographed by Todd Pusser



Birds aren't our only singing, tree-dwelling, insect-eating friends. Meet North Carolina's seven treefrogs.

Amphibians have come a long way since they first crept onto land, blazing the trail for us terrestrial vertebrates. Frogs, the most successful amphibians, have managed to colonize virtually every terrestrial habitat type. In fact, it might seem ironic that waterborne animals would venture into trees, but numerous frogs have done so. Just over half of North Carolina's 30 frog species belong to the large family Hylidae, which includes cricket frogs (genus *Acris*), chorus frogs (*Pseudacris*) and treefrogs (*Hyla*).

The genus *Hyla* derives from the Greek *hyle*, meaning "wood" or "forest," and probably also from Hylas, a beautiful youth in Greek mythology who was a favorite companion of Heracles. While fetching water during the Argonaut expedition, Hylas was dragged into a spring by enamored water nymphs and never seen again. Treefrogs probably inspired early-day naturalists to view them as nymphs of both wood and water. Though quite unlikely to abduct anyone, they have been known to capture hearts.

North Carolina has seven species of *Hyla* (not including a few formerly placed in that genus—such as the spring peeper, now included in *Pseudacris* with the chorus frogs, which it more closely resembles genetically and otherwise). Their arboreal adaptations include long limbs, large adhesive toe pads and skin secretions that help protect them from desiccation. If you haven't met all of the species, you probably should.

The barking treefrog is the largest treefrog in the state.

COPE'S GRAY | *Hyla chrysoscelis*

GRAY | *Hyla versicolor*

"whrrrrrrrr!"

Shades of Gray

The treefrog probably most familiar to the majority of North Carolinians is Cope's gray tree frog, *Hyla chrysoscelis*. The common name honors the 19th-century herpetologist, ichthyologist and paleontologist Edward Drinker Cope. This widely seen frog occurs virtually statewide.

Most specimens are some shade of gray, but individuals can range from greenish to nearly white. Irregular, dark, lichen-like markings on the body and limbs offer superb camouflage against rocks or tree bark. There is a prominent white blotch below the eye and bright yellow or orange spots on the concealed surfaces of the hind legs (the origin of the species name, which is Greek for "golden spot"). This coloration is thought to be a "flash pattern" to startle visually oriented predators when the frog leaps. The call is a rather harsh, forceful "whrrrrrrrr!" averaging about 45 trills per second.

These frogs breed from April to August, usually after heavy rains. Intolerant of fish, they usually use temporary wetlands, including roadside puddles, backyard swimming pools and even birdbaths. Though common, they are seldom encountered by humans during the day, unless found hiding in some sheltered spot.

The gray treefrog (*Hyla versicolor*) is a diploid version of the Cope's gray; that is, it has twice as many chromosomes—48 to the Cope's gray's 24. Identical in appearance, these two sibling species long masqueraded as one. Aside from examining their chromosomes in a genetics lab, researchers can separate the two by their calls. The gray treefrog's is slightly longer, more musical and less forceful, averaging about 25 trills per second. Essentially a Northern species, it has so far been documented in North Carolina only from a few sites in Warren and Caswell counties along the Virginia border, but it may occur at other localities in the upper Piedmont or Mountains.

Gang Green

The green treefrog, *Hyla cinerea*, is a common, slender, medium-sized treefrog, usually bright green (but occasionally dark green, brownish or olive) with a bold white stripe along each side (though sometimes the stripe is absent) and scattered, small gold spots on the back. Since *cinerea* is Latin for "ashy," the species was likely described from a faded, grayish, preserved specimen. More fish tolerant than any of our other treefrogs, it often breeds in permanent water, especially in beaver swamps or other heavily vegetated aquatic habitats. Its call, a ringing, slightly nasal "queenk," often heard in huge choruses, has given rise to such names as cowbell frog.

Historically a Coastal Plain denizen, it has recently expanded its range deep into the Piedmont. This might be due in part to the fact that treefrogs are excellent hitchhikers, sometimes stowing away in boats or automobiles, but that doesn't fully explain the steady westward expansion. More likely the green invasion is a result of habitat alteration. Beavers have returned to the Piedmont after being extirpated several decades ago, and beaver ponds may be the only wetland type that has actually increased in the region in recent years. Man-made ponds, lakes and reservoirs have also proliferated, many of them invaded by hydrilla and other aquatic weeds. These provide suitable green treefrog breeding habitat as long as they contain sufficient aquatic vegetation to offer the tadpoles refuge from fish and other aquatic predators. With so many amphibians losing ground, it's encouraging to see at least one native species potentially making gains.

Changeling

Our smallest *Hyla* is the squirrel treefrog, *H. squirella*. Named for its call, a nasal "waak, waak, waak" resembling that of a scolding squirrel, it inhabits most of our Coastal Plain and portions of the eastern and southern Piedmont. All treefrogs can undergo at least some degree of color change in response to temperature, light and moisture gradients, but the squirrel treefrog is a master. An individual may change from a heavily spotted brown or gray to an immaculate bright green or yellow. Known as rain frogs in some areas, squirrel treefrogs breed from April to September, most often after summer thunderstorms, when they gather in shallow ponds, ditches, flooded fields or other temporary wetlands. Like several other treefrog species, they are commonly seen foraging for insects around lights at night. They may also be expanding their range westward.

Dots and Dashes

The aptly named pine woods treefrog, *Hyla*

"queenk"

"waak, waak, waak"

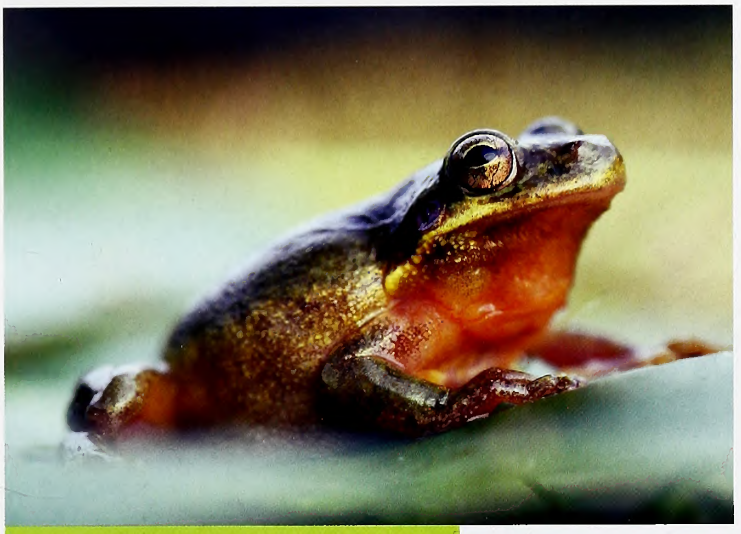
femoralis, inhabits primarily Coastal Plain pine forests, but it also occurs spottily in the eastern and central Piedmont. The species name refers to the distinct yellow, orange or white spots on the concealed surface of the femur. Usually some shade of brown or reddish brown, the species is capable of color change and may be gray or greenish. Slender and agile, it is equally at home high in the tree canopy or on the ground. Its call, a rapid "getta, getta, getta," reminiscent of Morse code or a riveting machine, is a common sound effect in pine savannas on humid days. Breeding may occur from late March to October, usually after warm, heavy rains. Like most of our *Hyla*, the pine woods treefrog breeds mostly in ephemeral wetlands. Its colorful tadpoles are among the most acid tolerant of all our frogs—an adaptation for breeding in some of the sphagnum-filled, tannic wetlands of our Coastal Plain.

Big Dog

Our largest treefrog (and my personal favorite) is the barking treefrog, *Hyla gratiosa*. Its species name is Latin for "favored" or "beloved," and it is indeed a beautiful, robust creature, with prominent round spots on a bright green to brown background (the spots may fade out as the frog undergoes various color changes). The throat and belly are often washed with yellow, and the lips, sides and legs are usually bordered in white. The skin has a granular texture.

Though most of our treefrogs breed in ephemeral wetlands, barkers can't use just any puddle or ditch. They require larger, deeper, true ephemeral ponds and may travel great distances to reach them. When they are out of the water, their call resembles a dog's bark. But when serious about breeding, they enter water and call while floating on the surface. The call then becomes a hollow "doonk!" Breeding choruses—heard between March and August—may still sound like dogs, but more like the baying of coon hounds. Males average slightly larger than females, though the opposite is true for nearly all our other frog species. Both arboreal and terrestrial, the barking treefrog inhabits portions of our southern Coastal Plain and lower Piedmont but is most common in longleaf pine savannas.

As amphibians go, treefrogs are not terribly long-lived, but the larger species may have



SQUIRREL | *Hyla squirella*

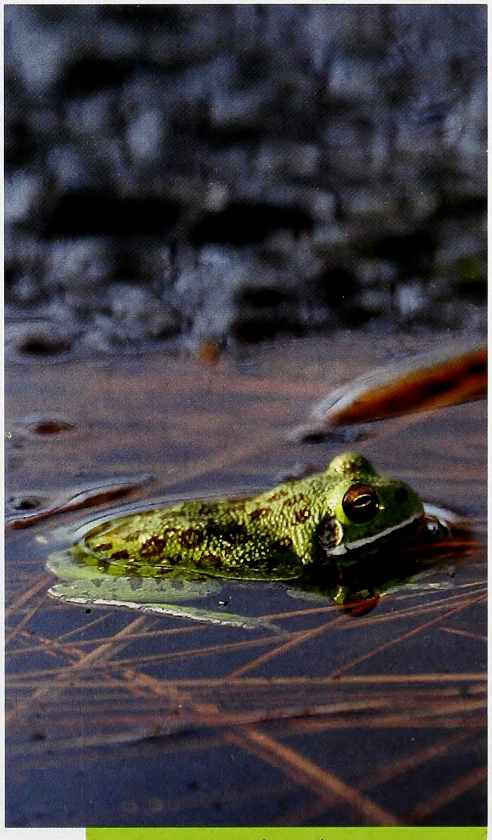
GREEN | *Hyla cinerea* (top right photo: juvenile green treefrog)

"doonk"

"getta, getta, getta"

PINE WOODS | *Hyla femoralis*

PINE BARRENS | *Hyla andersonii*



BARKING | *Hyla gratiosa*

respectable life spans. I once kept a barking treefrog in captivity for over 14 years, and my friend A. J. Bullard—a treefrog fanatic sometimes known as Dr. Hyla—has maintained specimens in outdoor enclosures for comparable lengths of time.

Pine Jewel

The Pine Barrens treefrog, *Hyla andersonii*, has been called our state's most beautiful frog. Among treefrogs, it's also the most habitat specific and (excepting the gray treefrog, which barely enters the state) the rarest. Bright green with a lavender stripe along each side and bright orange-yellow spots on the concealed surfaces of its legs, it has been nominated as a candidate for our official state amphibian. The common name references the New Jersey Pine Barrens, which harbor its northernmost (and disjunct) population. The species name comes from Anderson, S.C., which was originally designated as the type locality (the collection place of the specimen upon which the original species description was based)—erroneously as it turns out, because Anderson is well outside the species' range.

This secretive frog inhabits streamhead pocosins, seeps and pitcher plant wetlands surrounded by sandhill habitats in about 17 of our Sandhills and south-central Coastal Plain counties. Some of the healthiest populations are on Fort Bragg and Sandhills Game Land. The call, a nasal "quonk" repeated about 10 to 20 times, may be heard from late March to early September, but most breeding takes place from April to July. These shy frogs are often difficult to locate, but when in the mood to sing, they're easily induced to do so, even with a poor imitation of their call.

Treefrog Personae

All my life, treefrogs have been personalities and fixtures. I clearly recall my first encounter with each of our native species. I was perhaps 5 or 6 when I saw my first Cope's gray treefrog, clinging motionless to a cinder block along the edge of a Randolph County woodlot. I stared for a long time, wondering if the frog could possibly be real. I never touched it, and to this day I'm not sure why. Back then, most small creatures were happily grabbed and admired, and frogs were highly prized. It might have been because I was being called for supper, but thinking back, I rather believe

NATURE'S WAYS
How Can Frogs Jump So Far Without Injury?
See Nature's Ways, page 39.

that I was just too awed by how much the frog looked like part of that concrete block, and how wrong it would have felt to disturb anything so perfect.

My first squirrel treefrog a few years later was another story. I caught him after a long and patient stalk, on Brunswick County's Oak Island, in a small concrete pool amid the ruins of old Fort Caswell, where he was calling along with some narrowmouth toads. I joyfully popped him into a Dr. Pepper bottle and ending up keeping him for years.

I found my first pine woods treefrog in a large blueberry bush in Bladen County. I think I examined every leaf on that bush before finally spotting him after hearing him call. Neither will I forget my first Pine Barrens or barking treefrog, each found on a road at night (in Richmond County and southern Wake County, respectively), or my first green treefrogs, along the grassy dikes of Lake Mattamuskeet.

Treefrogs still feature in my everyday life. Each workday morning I ritualistically search for squirrel treefrogs in the recycling bins on our building's loading dock. From April to early December I usually find at least one, and often several. They breed in our stormwater retention pond and hunt insects at night on the loading dock, resting by day in the plastic bins. Occasionally green or Cope's gray treefrogs join them. If I don't find any, I still have living in my office a leucistic Cope's gray tree frog that has been featured in these pages before ("Carolina Freak Show," October 2007).

Having seen thousands of treefrogs, I am still stirred by them: huge green treefrog choruses; barking treefrogs crossing roads in two or three prodigious leaps; squirrel treefrogs crowded inside PVC pipes; Pine Barrens treefrogs in pitcher plants; the fine mist erupting around a barking treefrog as it floats, impossibly puffed with air, and forces that remarkable breeding call from its inflated vocal sac.

"queenk"

"quonk"

"whrrrrrrrr!"

"waak, waak, waak"

I'll never forget pointing a flashlight into a bay head to illuminate a Pine Barrens treefrog calling on a sweet bay leaf. Or being joined at the table by a pine woods treefrog while breakfasting in a little Bladen County grill. Or the day I was radio-tracking a snake across a sand ridge when I either heard a faint sound or felt a presence—I'm unsure which—and turned to see an emerald green barking treefrog exposed in an open patch of turkey oak leaves, as perfect as a Todd Pusser photo. I could only look. Why was it sitting in the open, far from water, in the middle of the afternoon? Treefrogs know a lot of things that I don't.

A Different World

I suppose such people exist—and I've a sneaking suspicion that there may be a significant segment of human society that I seldom interact with—but offhand I can't recall ever having met anyone professing to really hate treefrogs. Wherever I go, I see the frogs depicted in ads and logos, featured on objects in shops and galleries, and emblazoned on clothing, bumper stickers and tattoos. A friend has a captive barking treefrog she calls Fess Barker. She threatens to photograph him wearing a tiny coonskin cap. In a word, treefrogs are endearing. And why not? Their colors and patterns—whether subtle or striking—are nearly always visually appealing. The creatures are vibrant and energetic when active, and Buddha-like when at rest, their beatific expressions suggestive of serenity and wisdom. They are tremendous insect control agents. Their calls are friendly voices from the darkness.

The late, great Florida naturalist Archie Carr said it best: "Frogs do for the night what birds do for the day: They give it a voice. And the voice is a varied and stirring one that ought to be better known." Those who bother to know treefrogs are invariably glad they did.

SQUIRREL | *Hyla squirella*

leucistic COPE'S GRAY

Jeff Beane is a herpetologist with the N.C. Museum of Natural Sciences and a frequent contributor to Wildlife in North Carolina.

The Gift of Home Waters

illustrated by Joe Mahler

WRITTEN BY JIM WILSON

In the pools of a languid little river, an angler finds his grasp is well suited to his new reach.

IF A FISHERMAN IS FORTUNATE, he has a watery place he calls his own. He may not have legal title to the spot, probably doesn't, considering the slipshod habits and depleted finances of us "brothers of the angle," but he has made it his own by fishing it often and sometimes well. He has claimed his water by casting and catching, by watching and studying.

If fortune has indeed shone brightly upon him, a fisherman's home waters are running waters that are clear enough that he can see a fish eat his fly, or approach, investigate and turn away, having found some flaw in the offering. Either act can be instructive.

Like most fishermen, I've called many bodies of water my own, and some of them I have known intimately, known their moods, their pleasures and their occasional disappointing ways. They have taught me much about fishing and fish, and they have allowed me to learn lessons beyond fishing.

Other waters I have only trifled with, knowing from the start that they would at best make do until I found a better piece of water. Something about them wasn't right. I wouldn't delight in those waters for long; we simply happened to come together for a time, and the water gave up fish, perhaps very good fish, but it had no spirit. The water was nothing special, just another lovely reach of water, and beauty alone cannot define home waters.

Occasionally, those home waters you have loved lose their attraction. Maybe the water becomes too predictable; its quirks, once intriguing and charming, are now just tedious. The passion that attracted the fisherman to those waters diminishes to but a smoky wisp of remembrance, something less when the angler wants more. Is that the water's fault or the angler's? Perhaps it is both; either way, it is fatal to the union of man and water.

THE SHORT ROAD HOME

One day a fisherman realizes he has a made a decision without thinking, a common enough practice among anglers, and is looking for new home water. His search will not be a single-minded pursuit, no quest for a mythical lost gold mine that might drive a man mad with its promise and futility. He will look when he can, for anglers, like indolent suitors, trust in inevitability; they cleave to the tenets of mañana. He will stumble upon the object of his desire in the randomness of everyday life. Like when he turns around in a crowded store and stares into the eyes of a smiling stranger who he feels instantly could be the love of his life, the angler will know only at the moment of discovery when he has found what he is seeking. If that sounds a bit romantic and quixotic, it is. Practicality and angling tend to be mutually exclusive.

bend and recall places that should have produced fish and didn't, others that shouldn't have surrendered fish and did. I'd like to figure out that water some day. It's a good place for the quiet study of the mystery that is fishing.

Today my home waters are but a short drive away. I didn't find these waters on my own; they were a gift from my daughter, Betsy, who one day said, "Daddy, you want to go fishing? I know a place."

And indeed she did. She led me to a beautiful little river that runs through a suddenly hilly portion of the Piedmont, a place that requires little imagination to believe might be at the edge of the mountains. The river cuts between two bluffs, and the riffling water flows quickly into a large, clear, rocky pool. The stream falls into more riffles, and another pool lies in the shadow of a tall white bridge. I have waded this entire stretch and never found water deeper than 2 or 3 feet.

It is a dark place in the afternoons, shadowy but pleasant still and cool in the summer, a shady place to escape and mend lines and lives. In the mornings, the sun shines hard on the river and into your eyes. On the banks grow pines, mixed hardwoods and some of the healthiest poison ivy I've ever seen. Hundreds of opened mussel shells cover the banks, the remnants perhaps of some raccoon repast, their white interiors looking like a sudden spring explosion of flowering bloodroot.

It's a dark place in the afternoons, shadowy but pleasant still and cool in the summer, a shady place to escape and mend lines and lives.

In their truest sense, home waters should be near a fisherman's home, but we needn't be unnecessarily scrupulous about our definition of home. Home waters really are where your heart wants to be, and as my photographer friend Amy Dickerson says, "The heart wants what it wants." That is the way of people and the way of men and water.

My heart, if not my corporeal self, often finds its home in eastern North Carolina. It is impossible for me not to stop and gaze at the upper reaches of the Alligator River when traveling south on N.C. 94 toward Lake Mattamuskeet, which is a good three hours from my home. In that place and among those people I reclaim a peace that can be elusive elsewhere. As I study the river and note the direction of the wind bending the marsh grasses, I float around the first

They help camouflage the occasional beer bottle or rusted soft drink can. Schools of minnows undulate in the shallows, moving in unison to some piscine cue that is beyond my knowing.

It is truly a place for fishing, yet only once have I encountered other anglers there, an old man in blue jeans and T-shirt flanked by two similarly dressed children, a boy and a girl. They were bait-fishing the spillway pool below the dam that holds back a tiny lake, and the children, hopeful of a bite, were staring down at their red-and-white bobbers like hungry hounds eyeing a bowl of table scraps. The old man had opened a can of Vienna sausages (VY-eenas in this part of the state) and was spearing them with a pocketknife and handing them to the children, who removed the weenies and put them in their mouths without taking their eyes from the water.

The river slides over the 10-foot-tall concrete spillway here, creating the sparkling sound of tumbling water. I was headed for the river proper, and I approached them from behind through the trees. With the sound of water filling their ears, they did not notice me as I stopped to watch and then turned downstream.

AN UNEXPECTED HAVEN

When Betsy and I fished the river, it was a Sunday in May, weeks after the first full flush of spring, but still early enough in the year that leaves on the trees seemed to emit an intense, pulsing green of young plant life. Despite the highway that paralleled the river and the bridge a hundred yards away, we were secluded, alone and laughing in this sanctuary of water.

Because I was unsure of where we would fish, I left my fly rod at home in favor of a couple of ultralight spinning outfits. We began tossing tiny Rapala floating minnows and at once started catching redbreast sunfish. Few of them were of any size, but they were beautiful olive-backed fish, especially the males, who displayed luminous reddish orange bellies typical of the spawning season. They were voracious. I don't recall making more than four consecutive casts without hooking into a fish.

Of the two of us, I caught more fish, but I was doing nothing but fishing. Betsy, standing in flip-flops in the riffles wearing Soffe shorts and a T-shirt, her long blond hair clipped up on her head and hip cocked to one side, fished with one hand and sent text messages with the other. I couldn't help but think she was sort of missing the point and told her so. She looked at me and laughed, "I'm multitasking, Daddy. I heard that on *Oprah*." We proceeded to catch fish steadily for two hours. Betsy caught the only bass; I caught the only two crappies.

I have all my life been a counter of fish. It is, I am sure, a character flaw that will demand penance, perhaps a few hundred years languishing in a purgatory filled with mimes and devoid of beer. The urge to compile at least a figurative body count dates from my childhood, when I would see my dad come home from Kerr Lake with a big stringer of bass, for that lake in those days produced prodigious numbers of largemouths. I would count the fish, dull in death on the cool summer grass, as he prepared to clean them. From such innocent beginnings sprang the need to assign a mathematical definition to an activity that needs no definition other than that it exists. Fishing is a simple act comprised of many elements, but ultimately it should be a state of being that results in bliss, not numbers.

And yet I can tell you that on that sunny afternoon in a shady haven in the North Carolina Piedmont, my daughter and I landed and released 38 redbreasts, six bluegills, one largemouth and two crappies. Forty-seven fish.

I could have fished into the evening and continued under white moonlight, but Betsy had

Home water, or really any stretch of water, is a good place when you're weary of considerations and need to let your thoughts flow like floodwaters hunting the dry back reaches of creeks.

places to be. I had nowhere to be and in fact spent considerable time wondering where, metaphysically, I was in the world. It was not a new thought. We gathered rods and a tackle box and headed back to the car. I had no way of knowing that this Sunday would be the last time Betsy and I would fish before she left for college, as she took one large step from childhood into a world of adults.

"I love this place," I told her as I removed my hip waders and arranged tackle in the trunk. She smiled. "It's a good place," she said.

STAKING A CLAIM

In fact, I loved it so much that after work the next day I hurried back to the river, to see if it was truly that good, to make sure it retained its nature from one day to the next. If the first afternoon had been some liquid illusion, I wanted to know now. In an hour I caught 18 fish, all redbreasts but for a single bluegill.

I claimed the river that day, fishing alone on a warm spring evening. Over the next few weeks I returned to my new home waters several times, almost always with success. As the months heated up, I began to stay away. Without rain the river would be too low, and besides, the summer promised to be hectic, as Betsy busied herself with friends, work and preparations for college. Careless of our days and hours, she and I didn't worry when we couldn't fit a little fishing into any particular afternoon. And then, inevitably, all of our days to come became days that used to be and she was gone. I knew that May afternoon would not be the last time we fished, but I knew it marked the end of something I thought would never end.

September was hot, and I did not return to my home water that month. Only in October, with the arrival of the first cool days and nights of autumn, did I find the desire and the need to fish the river again. Home water, or really any stretch of water, is a good place when you're weary of considerations and need to let your thoughts flow like floodwaters hunting the dry back reaches of creeks. I don't know where that's likely to go better. Only one person knew I was fishing, and that seemed enough.

The day that I waded the river again had turned hot, into the mid-80s. I had dressed in a long-sleeved khaki shirt to hold back the early morning chill, but by 10 o'clock, I was wiping sweat from my forehead and my eyes, and my shirt was dark and wet in places and sticking to my chest. The fishing was good, and I landed a redbreast on my third cast. My next cast brought another to my feet. Soon I felt a harder, more determined strike and reeled in a small largemouth. I had crimped the barb on the popping bug's hook, so I had no need to lift the bass from the water to release it. A quick flick of my wrist and the green-and-white fish darted for the darker, swifter current of the far bank, where the water foams against crumbling red clay.

Later, I climbed on a large gray rock at the river's edge to answer my cell phone. Normally I don't carry that impediment to solitude when I'm fishing, but today, after several dark, difficult days, I needed this call, needed the peace it might bring. Afterward, I sat watching the river glide past and the minnows swirl. I resisted the urge to fish, afraid to disturb the intimate universe I had fashioned between these banks.

STREAMSIDE MUSINGS

A crow cawed and landed in the very top of a slender pine, its weight bending the tip of the tree to such a point that I doubted the bird could maintain its tenuous perch. Resting on its side in the farther pool lay the tub of an ancient washing machine, carried over the dam by heavy September rains. Many years ago, perhaps, a country housewife had folded her arms and

smiled as she proudly watched her children march off to school in clothes washed clean by her modern machine purchased at a dear price. She had saved her money carefully to make her family's life better. Now her dream had come to this, a battered piece of junk, used up and thrown away. I trust she got all the good out of it.

I had let my fly line and bug drift in the still pool and suddenly felt a quiver in my rod. Another redbreast had eaten the untended fly on the dead drift. I began to think of fishing and, instead of popping the bug, let it float as it would. The fish responded more vigorously, nearly every other cast bringing to hand a redbreast or the occasional bluegill.

I fished down the river, through the next series of riffles and into the far pool, beyond which a long, flat stretch of slow-moving water begins. The lower pool proved empty. I longed to fish that deeper, darker reach, where lay-downs and snags provide a haven for fish. The unfamiliar water seemed to whisper to me, promising that I might land the catch of my life if only I would try. Broken lines and lost flies would be the price for bigger, better fish. I was willing to pay that price. The dark water was my future, uncertain and tantalizing. For now, the bite was over. I was done. It was time to move on.

I walked along the bank, except when forced to wade because of shrubs and trees that grow thick and close to the river. The sun gleamed on the water, and it was hot on my face as I turned to take the day's last look at my home waters. I could still see Betsy fishing from the riffles as she had that day in May. I'm sure I can find her there still, laughing and talking and pulling fish from the clear water.

I climbed the steep slope through the trees and onto the shoulder of the road. An old man in a green pickup truck freckled with rust smiled when he saw me and raised two fingers to the bill of his cap as I carried my gear to the car. I grinned and raised my rod in a salute.

I'd like to think that when he returned home, he might tell his wife of having seen some younger fellow fishing his spot on the river, the very place he had taken her one bright Saturday afternoon before wrinkles and heartaches eroded their faces. "That was so long ago," she might say, but still smile at the memory and tug at her housedress to straighten it. "We did have fun there." More likely, he was just a man who, in the manner of old country men, waved at everybody and thought nothing special of seeing me walking from the river.

I leaned against the hood of my car for a few minutes, studying the calm surface of the little lake and considering, in the single-minded manner of anglers, how I might fish those waters. Leaves still held to trees, but they were surrendering the tired, worn-out green of summer and turning yellow, red and orange, a final salute to a season of life that presaged the drawn-out death of another year. Despite the heat of the day, when the wind freshened and I lifted my eyes toward the sky, I could smell winter. Change was coming. Dark, cold days were on the way, and I was not yet ready. I shivered at what lay ahead.

I wanted to linger in the autumn sun, soak up its warmth and let the breeze dry the sweat on my face, but life apart from water and fish was waiting. Practical matters demanded attention, and I had postponed them long enough. I had learned something in the river that morning, a couple of things I guess, and it all had been as simple as closing one door and opening another, the way you might as you drift through an empty house one final time before locking up and leaving the key on the kitchen counter for the new owner.

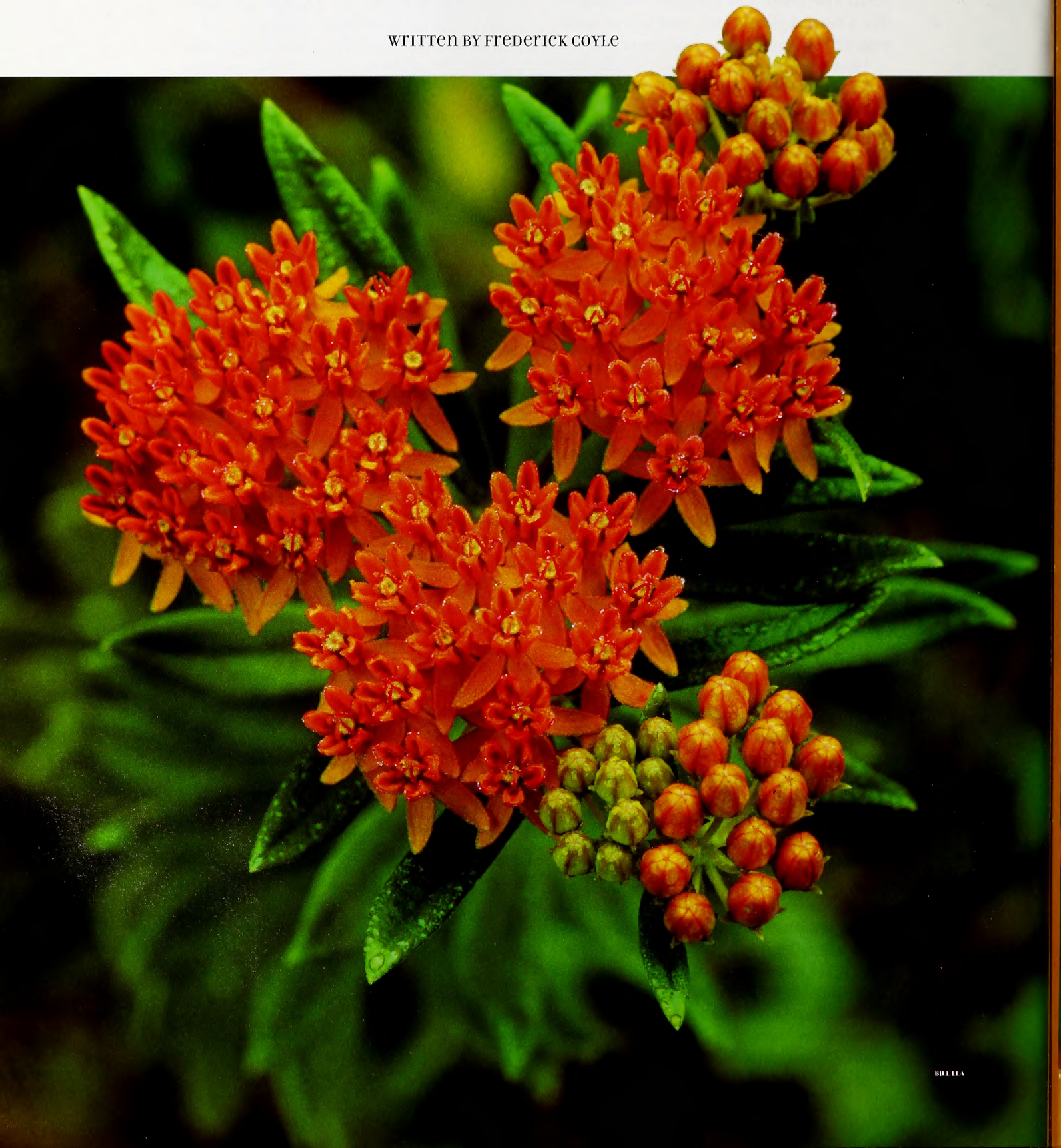
I reached in my pocket for my car keys and found a small stone I had picked up from the river, a souvenir that in weeks to come I would take from a shelf and touch to recall this day, this one good time in the dying of the year when I had found fish and answers in the water. As I drove away, I realized, too, that I had forgotten to count my fish. ◆

Jim Wilson is the associate editor of Wildlife in North Carolina.

VISUAL DELIGHTS AND CHEMICAL WARFARE

Butterfly weed is home to a buggy menagerie of creatures that have adapted well to the plant's defensive mechanisms.

WRITTEN BY FREDERICK COYLE



ALL PHOTOGRAPHS ON THIS PAGE BY FREDERICK COYLE

One of my 93-year-old mother's treasures is a large patch of butterfly weed she protects from the fellows who periodically mow her field. My twice-daily visits with her in her home, which is just a three-minute walk from mine on Cullowhee Mountain in Jackson County, are especially delightful in June and July when these plants are in full bloom. When the sun is shining and the bright yellow-to-red-orange flower clusters are swarming with butterflies and other insect visitors, I often make a slight detour to wander slowly through this natural garden. Like a kid in a candy store, I let my eyes enjoy the colors, structures and behaviors of the fascinating six- and eight-legged creatures that are part of the butterfly weed's world.

This summertime display of botanical and entomological delights can be enjoyed throughout North Carolina, from the Mountains to the Coastal Plain. Because butterfly weed (*Asclepias tuberosa*) likes full sun and well-drained soil, can thrive in nutrient-poor soil and is drought tolerant, it frequents roadsides, pastures and meadows and is a popular addition to flower gardens. This long-lived herbaceous perennial is one of the most beautiful of the 100-plus milkweed species in North America. The plant stands 1 to 3 feet tall and has slender hairy leaves attached alternately to a hairy stem. Its tuberous root

Clockwise from left: snout beetle, gray hairstreak butterfly, milkweed bug, crab spider, tiger swallowtail butterfly, honeybee, monarch butterfly caterpillar, soldier beetle, golden backed snipe fly.

FREDERICK COYLE

FREDERICK COYLE

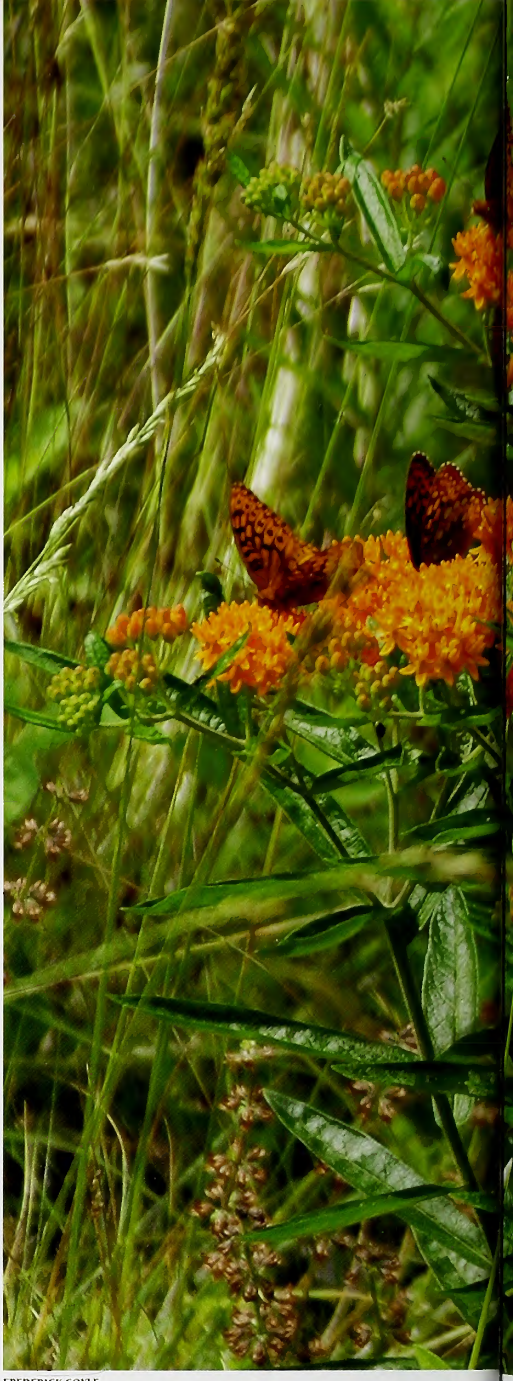
Butterfly seed pods open in late summer or early fall. Silky hairs attached to each seed allow the wind to disperse the seeds.

reaches deep into the ground, a habit that makes it difficult to transplant. It is the only milkweed that doesn't release from its ruptured stem or leaf veins a milky white, sticky, defensive secretion that can gum up the mouthparts of plant-eating insects.

Butterfly weed's small flowers are grouped in flat showy clusters, each flower consisting of a ring of five narrow drooping petals topped by a ring of five thick, erect petal-like structures collectively called a corona. Deep inside this corona are nectar-producing glands, a stigmatic surface receptive only to pollen from other butterfly weed plants, and five V-shaped pollen-bearing structures known as pollinia. At each of the two ends of a pollinium is a capsule containing many pollen grains. The entire pollinium is designed and positioned to adhere to the legs of nectar feeders for transfer to other butterfly weed flowers. This unusual type of pollen packaging is similar to that found in orchids and very different from the way most flowering plants release pollen. (Most other flowers produce multitudes of individual grains that are transported either on the mouthparts and body hairs of animal visitors or by the wind.)

A multitude of insect species are attracted by the vivid color of the flower clusters and the energy-rich nectar produced by each flower. The most obvious and, arguably, the most spectacular visitors are butterflies. In the Mountains, these commonly include the great spangled fritillary (*Speyeria cybele*), the Eastern tiger swallowtail (*Papilio glaucus*), the spicebush swallowtail (*Papilio troilus*) and the monarch (*Danaus plexippus*), but many other butterfly species and even some moths visit butterfly weed. Bees, including the non-native honeybee and many native species of solitary bees, are frequent visitors. I've encountered a wide variety of flies and beetles on butterfly weed and have observed some of them taking nectar. Several species of ants commonly wander over these plants and poke their heads into the flowers to lick the nectar.

In spite of the abundance of nectar-seeking insects—especially butterflies—that visit among the flowers of the many plants in a large patch of butterfly weed, it appears that most of these visitors are actually freeloaders. They help themselves to the nectar without pollinating the plants.



FREDERICK COYLE

Researchers have found that the chances are slim that any pollinium in a given butterfly weed flower will stick to a visitor and then be effectively transferred to a receptive flower on another plant. On average, only about 1 percent of the flowers on a plant actually receive pollinia and form fruits. Furthermore, studies show that bees, especially the larger ones that handle the flowers roughly, are much more likely than butterflies and other visitors to transport pollinia successfully from plant to plant.

Pollination compensation

Three butterfly weed design features help to compensate for this low rate of successful pollinium transfer: the large number of

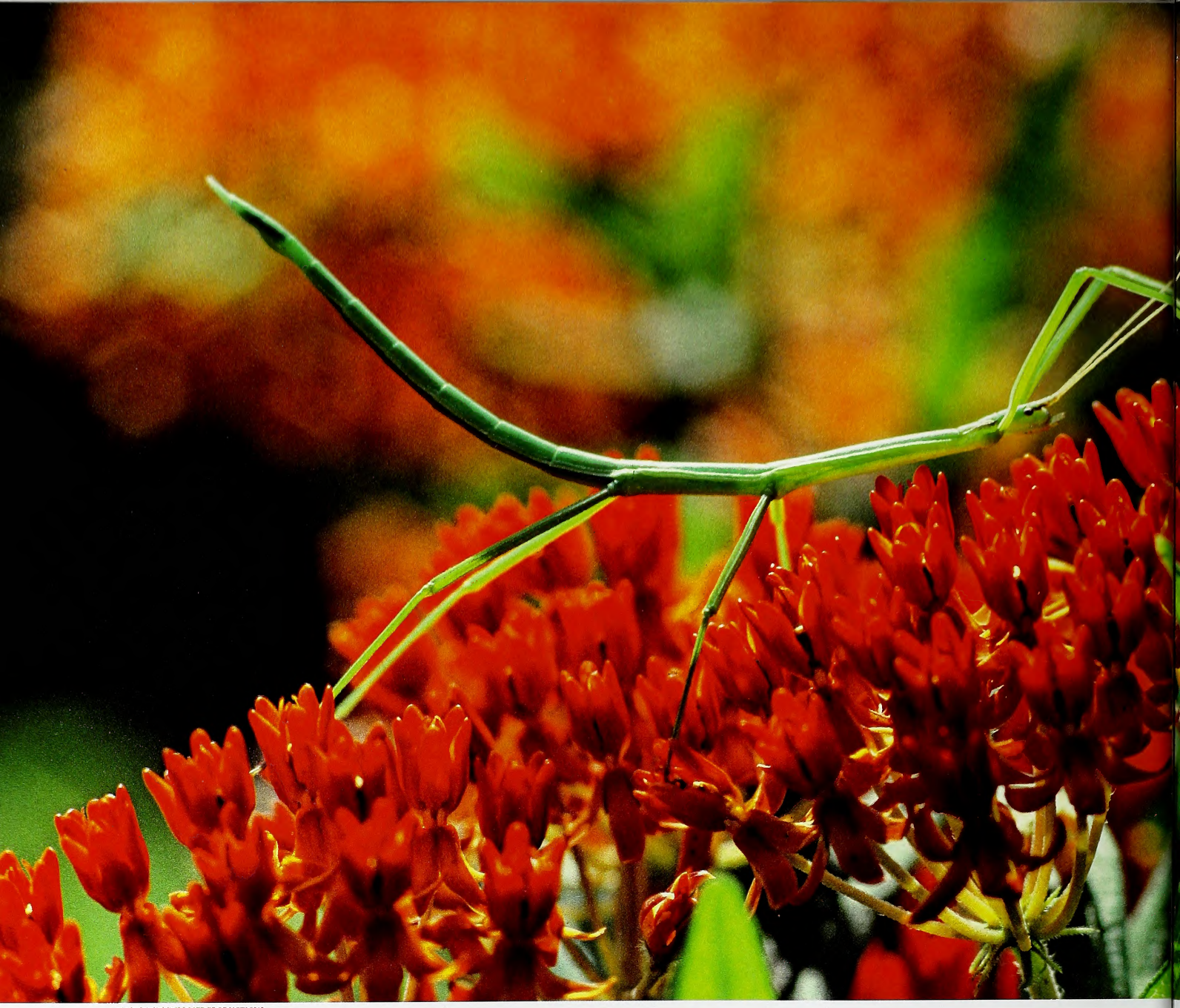
Various fritillaries are among the many species attracted to butterfly weed's vivid color and rich nectar.

flowers per plant, the abundance of pollen grains in each pollinium, and the multitude of seeds formed in a pod. Each of the lucky few successfully pollinated flowers will develop into a large, tapering pod 4 to 6 inches long containing many flattened, disk-shaped seeds. Tufts of silvery, silky hairs attached to each seed enable the wind to disperse them far and wide when the pod splits open in the late summer or fall.

Many of the other insect species that are associated with butterfly weed are herbivores that eat the tissues or sap of the plant. From the plant's point of view these visitors are unwelcome, but they do add color and diversity to the butterfly weed's menagerie. Among the most common and conspicuous of these moochers in the North Carolina mountains are caterpillars of the monarch butterfly, juveniles and adults of two milkweed bug species (the small milkweed bug, *Lygaeus kalmii*, and the large milkweed bug, *Oncopeltus fasciatus*), and larvae of milkweed leaf beetles (*Labidomera clivicollis*).

The monarch caterpillars are ringed with yellow, black and green bands, the milkweed bugs are bright orange-red and black, and the leaf beetle larvae have orange bodies and dark brown head regions. The caterpillars are gluttonous eating machines that chew their way through many flower buds and leaves, growing 2,000-fold in volume and weight during their short lives (two to three weeks) as caterpillars. The milkweed bugs pierce the plant with their long, needlelike mouthparts and then take in sap or inject digestive enzymes and suck up the partly digested plant tissue. Their favorite food is butterfly weed seeds, which helps explain why they often congregate on seedpods. The chubby little leaf beetle larvae munch away at leaf edges and flower buds.

Most plant species have evolved defenses that help protect them from some herbivores. The milkweeds, including butterfly weed, are no exception. Butterfly weed's primary



MASLOWSKI WILDLIFE PRODUCTIONS

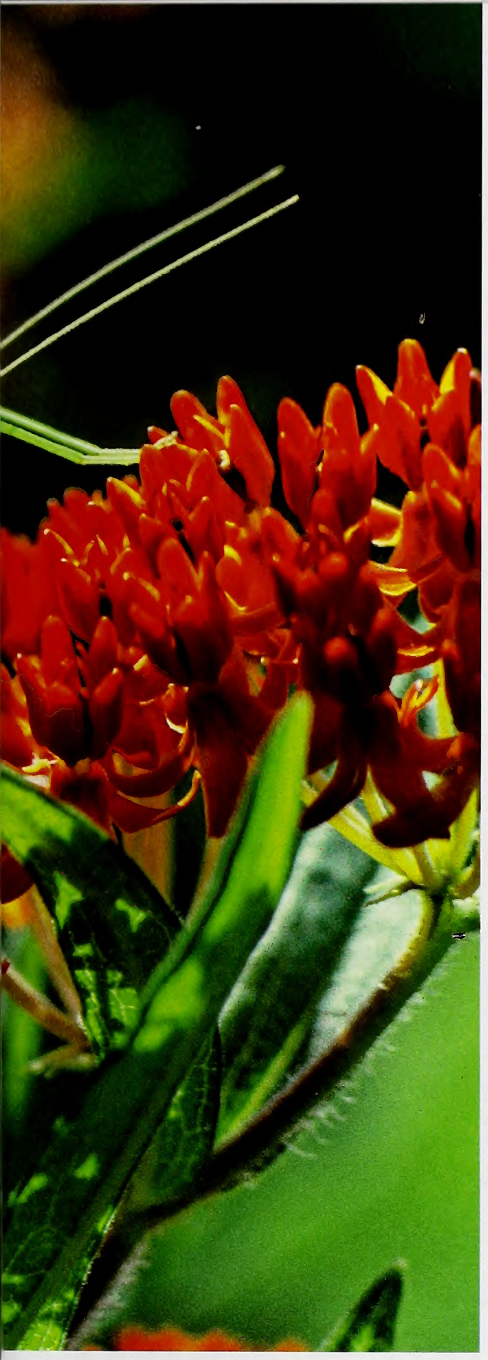
One of the joys of butterfly weed is that there's no telling what you might find on it. Monarch butterflies and caterpillars may be seen regularly, while errant walking stick bugs (above) might be a bit more uncommon.

weapon against herbivores is a group of chemicals known as cardiac glycosides, powerful purgatives that play havoc with digestive tracts and are even toxic to many animals. This is why deer and some insect pests of other garden plants usually don't bother butterfly weed, much to the delight of some flower gardeners.

The widespread use of butterfly weed for medicinal purposes by American Indians and early European settlers was due in part to the purgative and emetic effects of these glycosides. The plant came to be called pleurisy root because a tealike infusion made from its root was used to treat pulmonary problems such as asthma and bronchitis. Butterfly weed was used internally as an expectorant, laxative and diuretic, and as a poultice to treat bruises and rheumatism. This plant continues to be found in the medicine bag of many herbalists. However, its use in treating these and other maladies, whether due to the action of the glycosides or other chemicals, is not without risk. It is known that ingesting large quantities of the plant can, because of its cardiac glycosides, be toxic and even life-threatening.

Chemical weapons on parade

Although the cardiac glycosides in the tissues and sap of butterfly weed are effective weapons against some herbivores, it is obvious that monarch caterpillars, milkweed bugs and milkweed leaf beetles have evolved mechanisms allowing them to tolerate the large doses of glycosides they swallow. What



is even more remarkable is that these creatures incorporate the molecules into their own tissues and deploy them as chemical weapons against their mortal enemies, insectivorous birds.

Systematic studies show that a naive blue jay that grabs and immediately gags on a monarch butterfly will religiously refuse to attack any monarch butterfly it subsequently sees. Indeed, the bright contrasting colors of monarch butterflies, monarch caterpillars, milkweed bugs and milkweed leaf beetles serve as easily remembered warning signs. Smart predators such as birds quickly learn to associate them with the nasty taste and purgative effects of the cardiac glycosides the insects have sequestered from their milkweed food. This is the same visual tactic that protects other brightly colored and well-armed animals such as yellow jackets, millipedes and coral snakes from smart vertebrate predators.

The two milkweed bug species not only feed on butterfly weed; they also court and mate and deposit their eggs on the plant. The tiny orange-and-black nymphs that hatch from the eggs begin feeding on leaf tissue and keep growing until they become 1/2- to 3/4-inch-long adults with fully developed wings, ready to reproduce. These bugs are gregarious and congregate in groups of 10 to 50 or more with the help of an attractant pheromone that they synthesize and release, a perfume that lures other milkweed bugs to join the group. Without the protection of the noxious cardiac glycosides the bugs obtain from their food plant, and the warning coloration that communicates this defense to birds, such clustering in broad daylight would be group suicide. Perhaps this gregariousness even increases the speed with which birds learn to associate the bugs' bad taste with their color pattern.

Nectar feeders and glycoside-tolerant plant eaters are not the only arthropods that gather on butterfly weeds. Many kinds of spiders hang out on these plants and take advantage of the shelter and wealth of insect prey the plants provide. Crab spiders wait patiently among the flowers; grab butterflies, bees and flies with their spiny front legs; and immediately inject a powerful venom that instantly paralyzes even the strongest fliers. I've even observed crab spiders, apparently immune to the effects of cardiac glycosides, feasting on monarch caterpillars many times their weight.

Jumping spiders and lynx spiders — the cats of the spider world — hunt for insect prey more actively than crab spiders, patrolling leaves, stems and flowers until they see, stalk and pounce on a target insect. Many of these hunting spiders court, mate, place and guard their egg sacs on butterfly weed. Even orb-weaving spiders sometimes attach their aerial webs to butterfly weed and wait on the plant, with one leg touching a silk signal line, for good news vibrations from a struggling insect entrapped in the sticky web. Predatory insects, including paper wasps, stinkbugs, praying mantises and others, frequently hunt on butterfly weeds.

JEFF DANIELSON

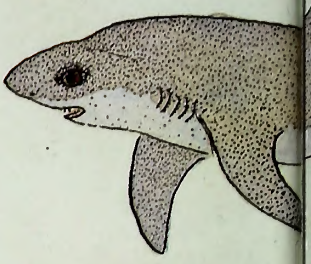
FREDERICK COYLE

Find a patch of butterfly weed and spend a half hour there some sunny summer day. All you need are good eyes and a healthy curiosity to enjoy the wonderful menagerie of interdependent creatures that abound on these beautiful plants. Equipped with a hand lens or close-focus binoculars or a digital camera, you can observe and record even more details from the web of interactions in this fascinating natural mini-community. It's even more rewarding if you share this activity with a child. As technological change accelerates and the artificial world of high-tech entertainment and virtual reality consumes more and more of a child's attention, we need to redouble our efforts to help children experience and understand the real world. A patch of butterfly weed is a fine place to get in touch with life. ◆

Frederick Coyle is professor emeritus at Western Carolina University, where he taught biology for 33 years.

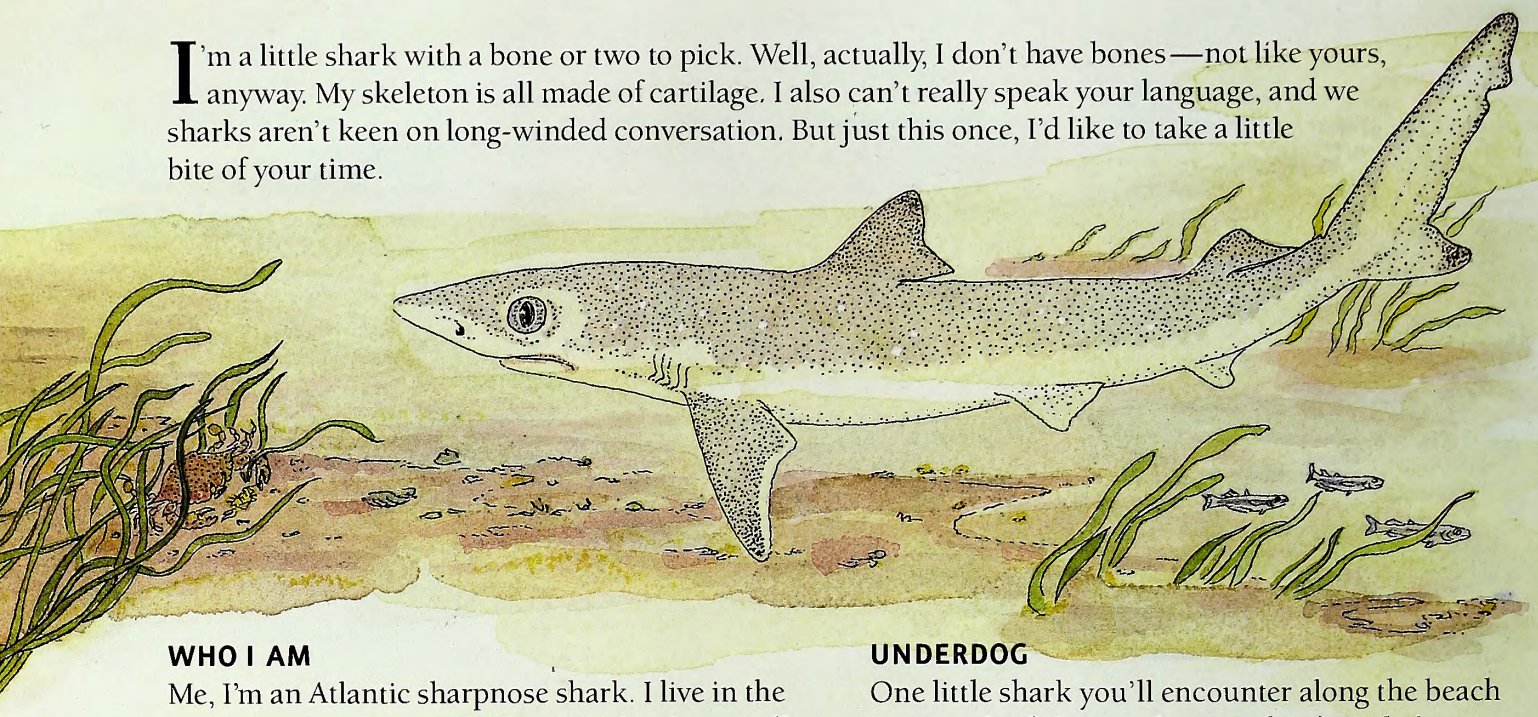
Sharks have swum the oceans for hundreds of millions of years. If one talked, would anybody listen?

Shark Talk



written by Jeff Beane / illustrations and nature activity by Anne M. Runyon

I'm a little shark with a bone or two to pick. Well, actually, I don't have bones—not like yours, anyway. My skeleton is all made of cartilage. I also can't really speak your language, and we sharks aren't keen on long-winded conversation. But just this once, I'd like to take a little bite of your time.



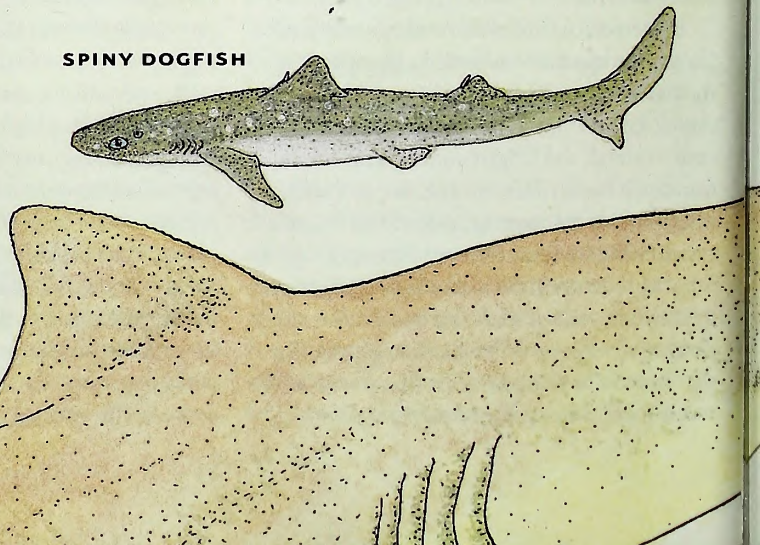
WHO I AM

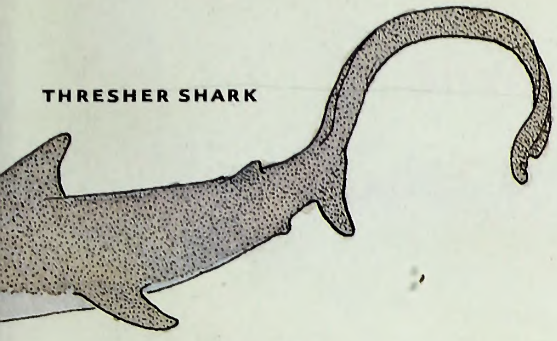
Me, I'm an Atlantic sharpnose shark. I live in the inshore waters along the barrier island you call Ocracoke. You could call me Sharpie. Or Sharky. Or even Sandy. Or *Rhizoprionodon terraenovae*—that's what your ichthyologists call me. But don't call me sand shark. Not that I particularly care. I have better things to do (namely, constantly swimming and eating) than worry about what you call me. But in fact, "sand shark" is a fictional category. We have a sandbar shark and a sand tiger shark along our coast, but I'm neither of them.

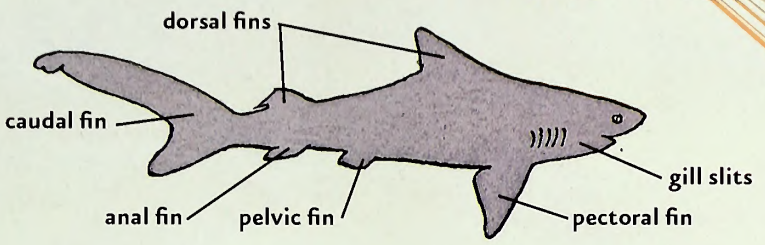
I'm probably the shark you're most likely to see, but at a glance I look like many others. Know me by my long, pointed nose; white-edged pectoral fins; often black-edged dorsal and caudal (tail) fins; and the scattered white spots on my body. And notice my fin placement—that's important in shark identification. The front edge of my second dorsal fin is situated above the center of my anal fin. In many of the sharks I'm confused with, those two fins are evenly placed.

UNDERDOG

One little shark you'll encounter along the beach is spiny dogfish (*Squalus acanthias*). He belongs to a different family—Squalidae—but he's also frequently lumped into the dreaded "sand shark" category. Like me, he may have scattered whitish spots, but he also has a spine on both dorsal fins, and no anal fin. You may have dissected him in anatomy lab. Seldom respected, always taken for granted, he's been troubled by overfishing lately.

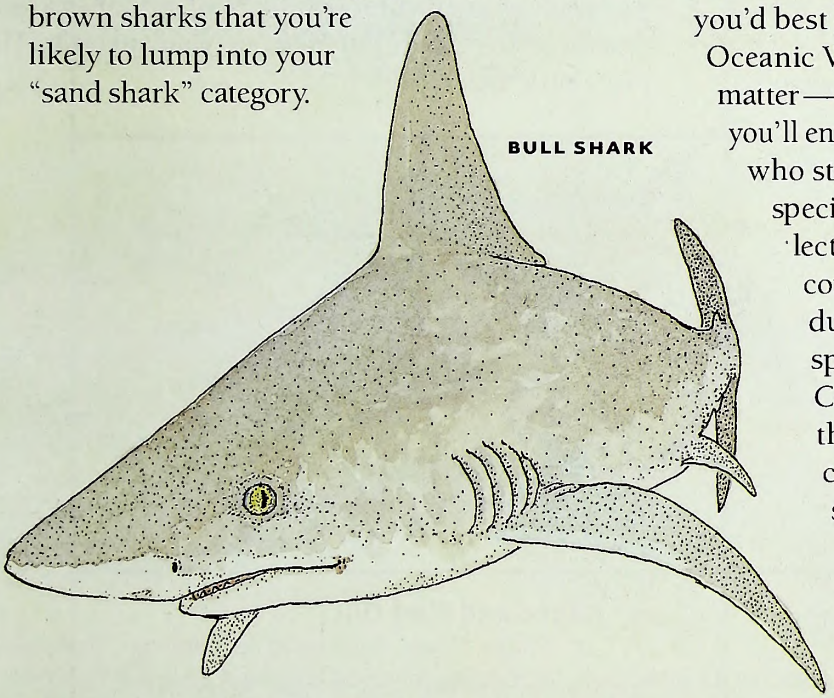






THE REST OF US

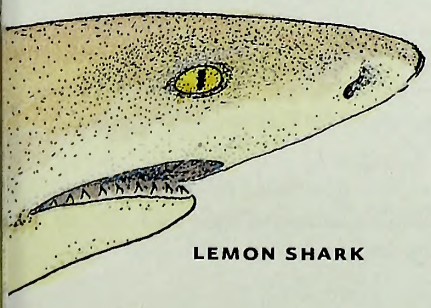
More than 50 shark species belonging to 10 different families live along North Carolina's coast. Some—like sixgill, Greenland and bramble sharks—are rare wanderers you'll probably never see. Others—like great white, whale and basking sharks—are uncommon giants you wouldn't mistake for any of the rest of us. Our four hammerheads and two threshers are fairly obvious. So's angel shark, who looks like a skate (don't tell her I said that). It's us small (whether as adults or the young of larger species), gray-brown sharks that you're likely to lump into your "sand shark" category.

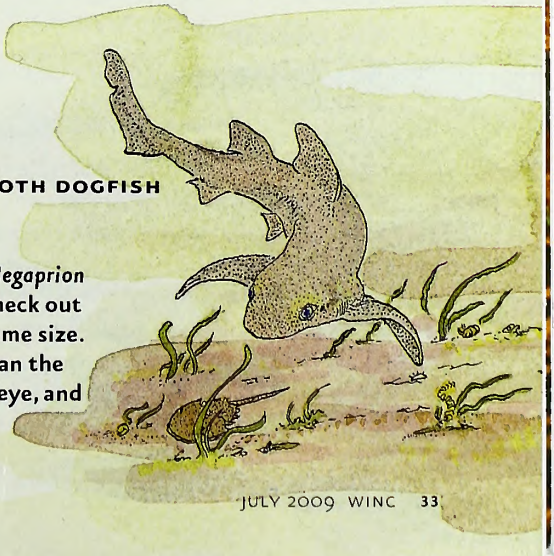


REQUIEMS

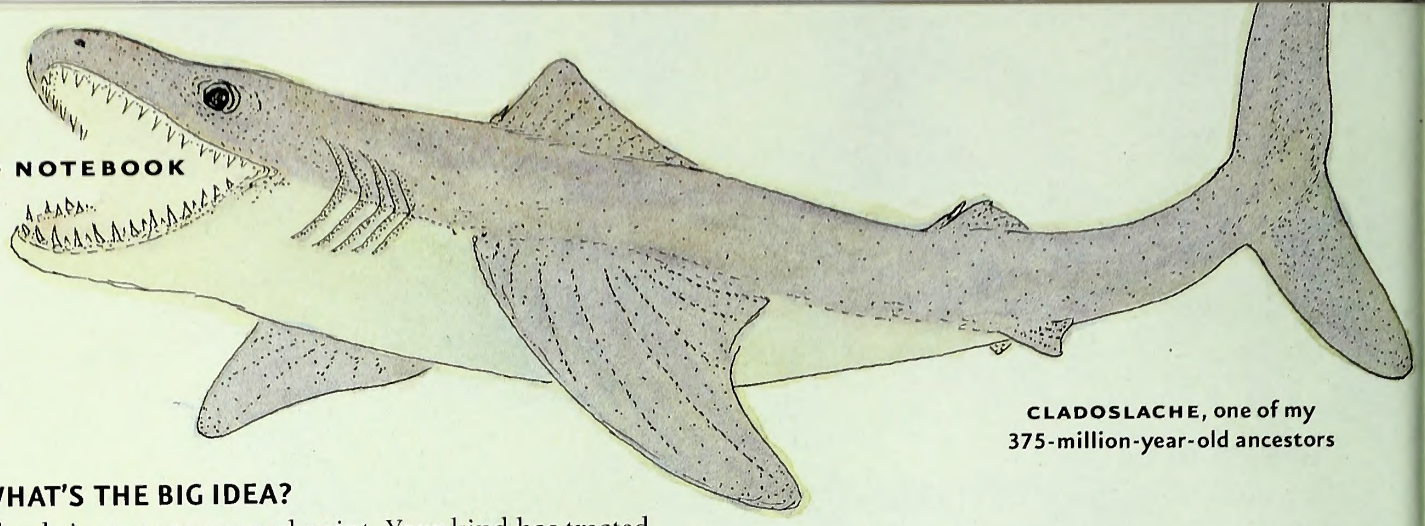
Most sharks you'll see—like me—belong to the family Carcharhinidae—the "requiem sharks." We're the largest shark family, including just over a third of all the sharks along the Carolina coast. We all have a "typical" shark shape, five gill slits, paired pectoral and pelvic fins, a caudal, an anal and two dorsal fins. We all bear our pups alive. Most of us are migratory, but some of us live here year-round.

A requiem is a song for the dead. Most requiem sharks won't likely kill you. Oh, there are a few exceptions. Tiger and Blue can be grim characters. And ol' Bull Shark's always hungry—he'll more likely set his teeth to junk food (that's you) than anyone else on our coast. And you'd best give large specimens of Blacktip, Dusky, Oceanic Whitetip—any really large shark, for that matter—a wide berth just to be safe. But most sharks you'll encounter will be small requiems—either those who stay small like me, or the young of bigger species. Those in the genus *Carcharhinus*—collectively called "whaler sharks"—can be quite confusing. These include bignose, blacknose, dusky, finetooth, night, sandbar, silky and spinner. Several of them bear their pups in Carolina waters during summer. To identify them, you'll have to look closely at subtle characteristics like tooth structure and fin shape and placement. That's why you have field guides—we sharks don't need 'em.





Smooth dogfish (*Mustelus canis*) and lemon shark (*Negaprion brevirostris*) are two other requiems you may see. Check out the dorsal fins on these two—they're nearly the same size. On most of us, the second dorsal is much smaller than the first. Smooth dogfish also has a spiracle behind his eye, and lemon is pale yellowish.



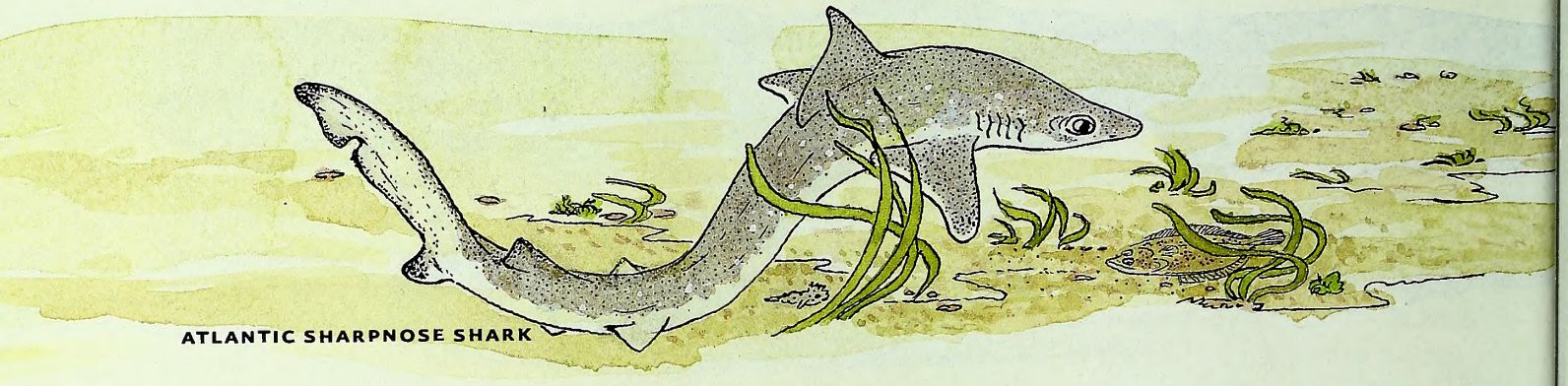
CLADOSLACHE, one of my 375-million-year-old ancestors

WHAT'S THE BIG IDEA?

That brings me to my real point. Your kind has treated mine badly. Often you invade our space, posing as food. Rarely do we eat you, or try to. And this bothers you? You kill us because you fear or hate us. We're portrayed as monsters in your literature and films. You hack off our fins for Asian soup markets, or our jaws for trophies or curios. Your recreational anglers throw us little sharks on the sand to die, for no reason other than you consider us an annoyance.

I'd be more than annoyed if I had emotions. But I don't. I don't have morals, either, but you do. We sharks never needed these things to survive all these millennia. We have other things—adaptations you'd kill for. Electroreception. Replaceable teeth. Remarkable navigational abilities. An immune system to die for. We can feel pain, and we have important roles to play in the world. We kill to eat. When you see us, you see the oldest and best of nature's showcase. That's no boast. We simply found perfection a long time ago and never deviated from it.

Enough of my jawin'. You've likely had a bellyful of my sharkasm. Time for me to return to what I do—swim, eat, grow, breed, survive. My folk have done just that for 400 million years. Now you're here. What if we survived *together* for another 400 million? How's that for a novel idea? But ideas are your specialty. I'm just a little shark.



ATLANTIC SHARPNOSE SHARK

Get Outside

My kinfolk and I aren't easily observed unless you're a diver. But if you're a saltwater angler, you might occasionally catch one of us, or see one of us caught. Most of us make fine eating if you take the time to prepare us properly. Being partial to flesh consumption myself, I couldn't rightly fault you for that. But otherwise, we'd just as soon be gently and respectfully released to keep doing what we've done for longer than you can imagine. If you find one of us dead on the beach, you might want to try your hand at identifying us properly (take photos to compare later if you don't have a good field guide with you). Your three North Carolina aquariums (Manteo, Pine Knoll Shores, Fort Fisher) all have some of my relatives imprisoned. But they don't mind so much. It's an easy life for them, and an excellent opportunity for you to observe them.

Read and Find Out

- "Sharks, Skates, and Rays of the Carolinas" by Frank J. Schwartz, University of North Carolina Press, 2003.
- "A Field Guide to Atlantic Coast Fishes of North America" by C. Richard Robins, G Carleton Ray, John Douglass, and Rudolf Freund, Houghton Mifflin, 1986.

In *Wildlife in North Carolina:*

- "The Sharks of Summer" by Jay Barnes, August 2008.
- "Swimming with Tigers" by Todd Pusser, May 2009.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

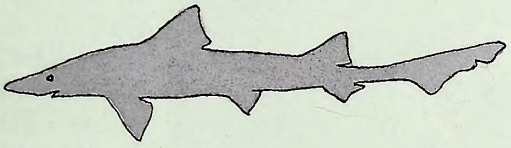
Shark Shape Card Games

How to be a card shark

1) Copy the 6 shark cards 4 times on cardstock.
2) Cut out all 24 cards and shuffle.
3) Lay cards face down on table. Players will take turns to find matching pairs of sharks.
4) One player begins by turning over 2 cards.
5) If cards match, keep them and turn over 2 more cards.
6) If cards show different sharks, turn them both face down.
7) It is now the next player's turn. Continue play until all sharks have been matched.

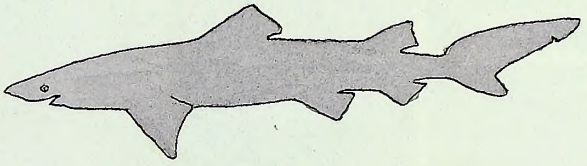
These 24 cards can also be used to play "Go Fish." For online directions, visit: http://pagat.com/quartet/gofish.html

Found in rivers, estuaries, sounds and offshore.



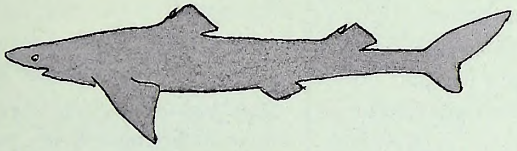
SMOOTH DOGFISH
(to almost 5 feet long)

Found in rivers, estuaries, sounds and offshore.



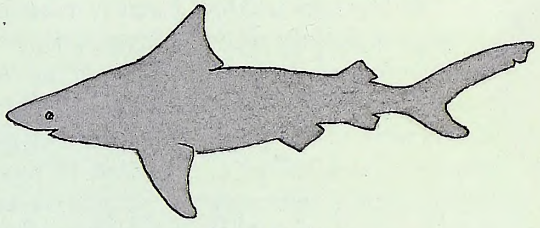
LEMON SHARK
(to about 11 feet long)

Found in rivers, estuaries, inshore and offshore.



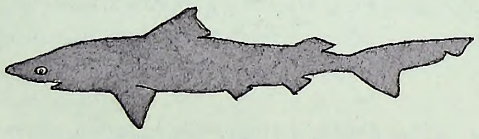
SPINY DOGFISH
(to almost 5 feet long)

Found in rivers, inlets, sounds and offshore.



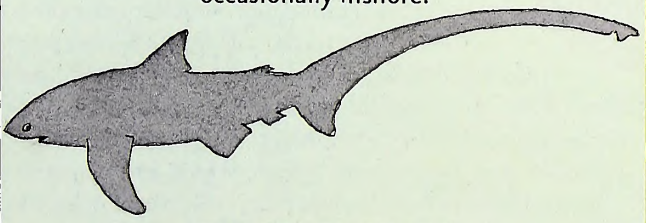
BULL SHARK
(to almost 8 feet long)

Found in sounds,rivers, inshore and offshore.



ATLANTIC SHARPNOSE SHARK
(to almost 4 feet long)

Found offshore, over the continental shelf and occasionally inshore.



THRESHER SHARK
(to about 16 feet long)

This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Largemouths Inherit Tendency to be Caught

In an experiment spanning over 20 years, researchers at the University of Illinois in Urbana have found that vulnerability to being caught by anglers is a heritable trait in largemouth bass.

The study began in 1975 with the resident population of bass in Ridge Lake, an experimental study lake in Fox Ridge State Park in Charleston, Ill. The fishing was controlled. For example, anglers had to reserve times, and every fish that was caught was put into a live well on the boat. The fish were measured and tagged to keep track of how many times each fish had been caught. All fish were then released.

"We kept track over four years of all of the angling that went on, and we have a total record—there were thousands of captures," said David Philipp, ecology and conservation researcher at Illinois-Urbana. "Many fish were caught more than once. One fish was caught three times in the first two days, and another was caught 16 times in one year."

After four years, the pond was drained, and more than 1,700 fish were collected. "Interestingly, about 200 of those fish had never been caught, even though they had been in the lake the entire four years," Philipp said.

Males and females from the group that had never been caught were designated Low Vulnerability (LV) parents. To produce a line of LV offspring, these parents were allowed to spawn with each other in university research ponds. Similarly, males and females that had been caught four or more times in the study were designated High Vulnerability (HV) parents that were spawned in different ponds to produce a line of HV offspring. The two lines were then marked and raised in common ponds until they were big enough to be fished.

DUANE RAVER

MELISSA McGAW / NCWRC

One bass in the study was caught 16 times in one year.

"Controlled fishing experiments clearly showed that the HV offspring were more vulnerable to angling than the LV offspring," said Philipp.

This selection process was repeated for several generations over the course of the 20 year experiment.

"As we had predicted, vulnerability was a heritable trait," he said. Philipp went on to explain that with each generation, the difference between lines in angling vulnerability grew even larger.

"Most of the selection is occurring on the LV fish—that is, for the most part, the process is making that line of fish less vulnerable to angling. We actually saw only a small increase in angling vulnerability in the HV line," Philipp said.

Male bass are the sole caregiver for the offspring. Females lay eggs and leave. The male guards the nest against brood predators for about three to four days before the eggs hatch and another eight to 10 days after they hatch, before they become free-swimming. Even after the baby bass start to swim, the males stay with them for another three weeks while they feed and grow, protecting them from predators.

Philipp explained that the experiment sped up what's actually happening in nature. "In the wild, the more vulnerable fish are being preferentially harvested, and as a result the bass population is being directionally selected to become less vulnerable. We selected over three generations, but in the wild the selection is occurring in every generation.

"We've known for 50 years that commercial fishing exerts selection on wild populations," he said. "We take the biggest fish, and that has changed life histories and growth patterns in many populations of commercially harvested species. Because there is no commercial fishing for bass, we were assessing the evolutionary impacts of recreational fishing."

Philipp explained that the perception among anglers is that catch-and-release has no negative impact on the population. During the spawning season, however, if bass are angled and held off of their nests for more than a few minutes, when they are returned to the lake, it's too late; other fish have found the nest and are quickly eating the babies. Phillip recommends that management agencies should eliminate the harvest of bass during the reproductive period.

On Vacation? Visit an Education Center

Whether you're vacationing at the coast, the mountains or making a trip to the Piedmont, the N.C. Wildlife Resources Commission has a wildlife educational center in the area. The commission operates four regional wildlife centers that offer programs and exhibits about North Carolina wildlife for school groups and the public.

The Pisgah Center for Wildlife Education is located on the Davidson River in the Pisgah National Forest near Brevard. Programs concentrate on mountain stream ecology and outdoor skills such as fishing and wildlife observation. A live exhibit of fish, amphibians and reptiles tells the story of aquatic mountain habitats, and next door to the center is the Bobby N. Setzer Fish Hatchery.

The Centennial Campus Center for Wildlife Education in Raleigh offers onsite and distance learning programs on Piedmont habitats, urban wildlife, sustainable living and wildlife careers. Multimedia exhibits explore technologies such as GIS used by wildlife biologists to study changes in Piedmont wildlife.

The Outer Banks Center for Wildlife Education, located in Corolla, offers educational programs and a soundside boardwalk trail that interpret the natural history and sporting heritage of northeastern North Carolina. A significant decoy collection and other artifacts from the area's rich waterfowling traditions are on display, along with an 8,500-gallon aquarium of fishes of the Currituck Sound.

The newest wildlife center is the John E. Pechmann Center for Fishing Education in Fayetteville, which offers family-oriented fishing experiences and aquatic programs for anglers of all ages and abilities.

Visitors to the Outer Banks, Centennial and Pisgah centers also will find an N.C. Wild Store, each of which offers nature-oriented merchandise, including books, posters, artwork and apparel. Mention coupon code WINC09 to receive a 10% discount on Wild Store purchases.

Visit www.ncwildlife.org or call (919) 707-0209 for more information on wildlife education centers, programs and products.

PHOTOGRAPHS BY MELISSA McGAW / NCWRC

Boaters Must Steer Clear of Brown's Island

As the heart of summer approaches, recreational boaters look longingly to the warm, clear coastal waters of Onslow Bay and the Intracoastal Waterway (ICW). But not every beautiful seascape is as it seems.

The United States Marine Corps and Department of Defense warn citizens against landing on or anchoring around Brown's Island, a small barrier island that serves as a live-fire range for Marines and sailors at Camp Lejeune.

The Onslow County area between Bear Inlet and Brown's Inlet is property of the U.S. government and is known to contain potentially deadly unexploded ordnances from machine gun, rocket, mortar, field artillery and ship-to-shore firing.

"It looks inviting, but don't be fooled by appearances," said Lt. Col. Russ Jamison, director of the Range Control Division at Camp Lejeune. "Brown's Island is a dudded impact area and has been used since the 1940s as a bombing range. Though we have removed and destroyed many items over the past few months, including 500-pound bombs, many more unstable pieces of unexploded ordnance remain hidden under the sand and brush, or are waiting to be washed ashore by the waves."

Camp Lejeune officials said that effective immediately, unauthorized users of Brown's Island will be ticketed to ensure public safety. Military police, in concert with the U.S. Coast Guard, regularly patrol the area and will issue citations to trespassers that will require an appearance before the federal magistrate in Wilmington and face maximum fines of $5,000 and six months' imprisonment.

The island is ringed in signage warning the public of the dangers and consequences of trespassing. Boaters traversing the ICW behind Brown's Island may not drop anchor, but are allowed to drift for the purposes of fishing or other recreational activities. Within Brown's Inlet, boaters may stop and anchor during non-live-fire training, but are forbidden from disembarking on the island for any purpose.

According to base officials, these actions are being taken to better protect the safety of recreational boaters and fishermen who frequent the area.

–Jamie Cameron

CALENDAR OF EVENTS

SATURDAY, JULY 11

Check out the annual Coon Dog Day in Saluda. Festival begins at 7 a.m., contests and judging for dogs starting at 1 p.m. at Saluda Elementary School.
Call (828) 749-2581.
Visit www.saluda.com

SATURDAY, JULY 25

Learn about boats and boat-building at the Wooden Boat Festival at Cape Fear Community College in Wilmington. The event will feature more than 50 boats of various sizes. Call (910) 362-7175.

TUESDAY, JULY 28

Practice your skills at Fly-Fishing on the Water at the Pisgah Wildlife Education Center near Brevard. Learn about casting, fly selection, presentation, entomology and knots during this morning session.
Call (828) 877-4423.
Visit www.ncwildlife.org.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

IN SEASON

This month, these seasons are open in North Carolina:

Crow:
Season runs from June 1, 2009, to Feb. 28, 2010.

Hatchery Supported Trout Waters:
Through Feb. 28, 2010.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2009–2010 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Snakehead Confirmed in Lake Wylie

An angler fishing the Paw Creek arm of Lake Wylie in Mecklenburg County in April caught a 31-inch Northern snakehead. Gary Upton, of McAdenville took the fish, weighing 12 pounds, 7 ounces, to a N.C. Wildlife Resources Commission fisheries biologist who initially identified the fish as a snakehead. The biologist then sent the fish to Wayne Starnes, curator of fishes at the N.C. Museum of Natural Sciences. Starnes confirmed the identification of the fish as a Northern snakehead.

Biologists sampled the area but did not find more snakeheads. They will continue to assess the 13,443-acre lake in conjunction with staff from Duke Energy and the S.C. Department of Natural Resources to identify the extent of the snakehead infestation. Based on their findings, management strategies will be developed to control Northern snakeheads.

The capture of a Northern snakehead is potentially bad news for the Lake Wylie fishery, as well as Lake Wylie anglers. Northern snakeheads, which are native to eastern Asia, can cause undesirable impacts on native fishes in waters where they have been illegally introduced by competing for food and habitat, and through direct predation. An established snakehead population could reduce the abundance of popular native game fishes, such as largemouth bass and crappie, by direct predation or indirectly by feeding on their prey base, and, thereby, affecting angler catch rates.

Because of the potential negative impacts of snakeheads on existing fisheries, the Wildlife Commission passed a regulation in 2004 making it illegal to transport, purchase, possess or sell live snakeheads in North Carolina.

In May 2007, an angler caught — and unwittingly released — a Northern snakehead back into Lake Wylie. He mistook it for a bowfin, but did take a photograph of the fish, which served as the basis for its subsequent identification. While confusing a bowfin and a snakehead is an easy mistake to make, distinguishing between the two species can be straightforward.

"The best way to distinguish between a bowfin and a snakehead is to look at the anal fin, which is the bottom-rear fin near the tail," said Doug Besler, a fisheries supervisor with the commission. "The snakehead has a very long anal fin that is more than half the length of the dorsal [back] fin. The bowfin has a shorter anal fin that is less than half the length of the dorsal fin."

To help more anglers correctly identify Northern snakeheads and to encourage them to report any snakehead captures, commission biologists are posting flyers that illustrate the difference between a bowfin and a Northern snakehead at locations around Lake Wylie. A printer-friendly version of the flyer is posted at www.ncwildlife.org/pg03_Fishing/SnakeHeadFlyer_053007.pdf.

Additional information on snakeheads can be found at the U.S. Geological Survey's Web site, http://fisc.er.usgs.gov/Snakehead_circ_1251/html/flyer.html.

NCWRC

How Can Frogs Jump So Far Without Injury?

written by Jeff Beane
illustrated by Jim Brown

FROGS ARE THE BEST JUMPERS OF ALL VERTEBRATES. **Several muscular and skeletal adaptations make their unique locomotion possible.**

The radius and ulna are fused into a single, strong forelimb bone — the radioulna — to help absorb the impact of landing.

radioulna

Frogs have only five to ten vertebrae, and no ribs to break during hard landings. The protection sacrificed by this reduction in the thoracic skeleton is more than compensated for in weight reduction and increased mobility.

The ilium is elongated and forms a mobile joint with the sacrum. This functions like an additional limb joint, adding power to leaps.

sacrum

ilium

Almost all of a frog's greatly enlarged hind leg muscles are modified to contribute to the action of jumping. Only a few small muscles function in returning the leg to its original position. In most frogs, muscles involved in jumping account for 15 to 20 percent of total body mass.

A frog's tibia and fibula are fused into a single, strong bone — the tibiofibula. The tarsal bones (humans have seven) are reduced to two in frogs — the astragalus and calcaneum. These are partially fused and elongated, increasing leverage. The metatarsals are also elongated, adding leg length and allowing the frog greater thrust during a jump.

tibiofibula

metatarsals

tarsals (astragalo-calcaneum)

BARKING TREE FROG

LITTLE GRASS FROG

Larger frogs usually jump greater overall distances, but smaller ones jump farther in proportion to their body size. The little grass frog — North Carolina's smallest species — can jump 20 times its body length!

In strong jumpers like treefrogs, the power exerted during a leap may actually exceed the muscle's capability. Frogs store energy in their elastic tendons, releasing them like springs during a jump for a power boost beyond that allowed by muscle-powered acceleration.

Something Fishy

written by Jim Dean

The phenomenon of beginner's luck is well known among fishermen. There may even be a statute somewhere dictating that the rankest novice is invariably going to catch more and bigger fish than anyone else. However, a beginner's card expires once it is used, so there are no extended benefits. After it's played, you're on equal footing with everyone else.

JIM DEAN

Most of us understand and are tolerant of beginner's luck—it is relatively benign—but there is an insidious subspecies that is more annoying and far more pervasive. This card never expires, nor can it be transferred or loaned to another fisherman. It is issued to a handful of fortunate—and, possibly, undeserving—fishermen early in life, and it functions like a perpetual get-out-of-jail-free card. Every angler knows someone who's got one of these "fishy" cards. These individuals are invariably regarded with a mixture of admiration, envy and, sometimes, suppressed loathing because they not only catch fish when you can't, they catch bigger fish and more of them.

"Some of my fishiest friends realize that the best fishing isn't always about size and numbers."

I have many friends who are better fishermen than I am. Most have made a lifetime commitment to achieve their level of success. They fish a lot; their casting skills are superior; they are keen observers; and they are inventive, smart and persistent. But some—not me, alas—also have that little extra advantage. They're fishy, and when their advanced skills and seemingly inexhaustible pursuit of fish doesn't get the job done, they always find some way to play their card.

"Wow, did you see that?" they'll exclaim. "I can't believe I hooked that big bass on my back cast. The bug barely touched the water, and he was all over it like white on rice."

One of the biggest stripers I ever saw was caught by an angler who left his lure dangling over the side of the boat while he was rooting around in his tackle box for something or other. A 26-pounder rolled up and engulfed his lure.

On another occasion when I was fishing a crowded pier, only one fisherman was catching anything, and he was catching big Spanish mackerel on nearly every cast. All the rest of us tied on an identical lure, cast at the same time and reeled when he reeled—to no avail. We knew what was in his wallet.

Jack Avent and Phil Cable are certainly fishy. They concentrate on largemouth bass mostly, with Jack preferring to fish smaller lakes, millponds and farm ponds, while Phil is a reservoir specialist. I love to fish with them because I learn stuff even as I'm being whipped. Likewise, my trout-fishing buddies Eddie Pinkston, Cam Cantwell and David Fussell hold lifetime fishy cards, and regardless of whether we're fishing a Tennessee tailwater or a Montana river, they're going to kick butt piscatorially.

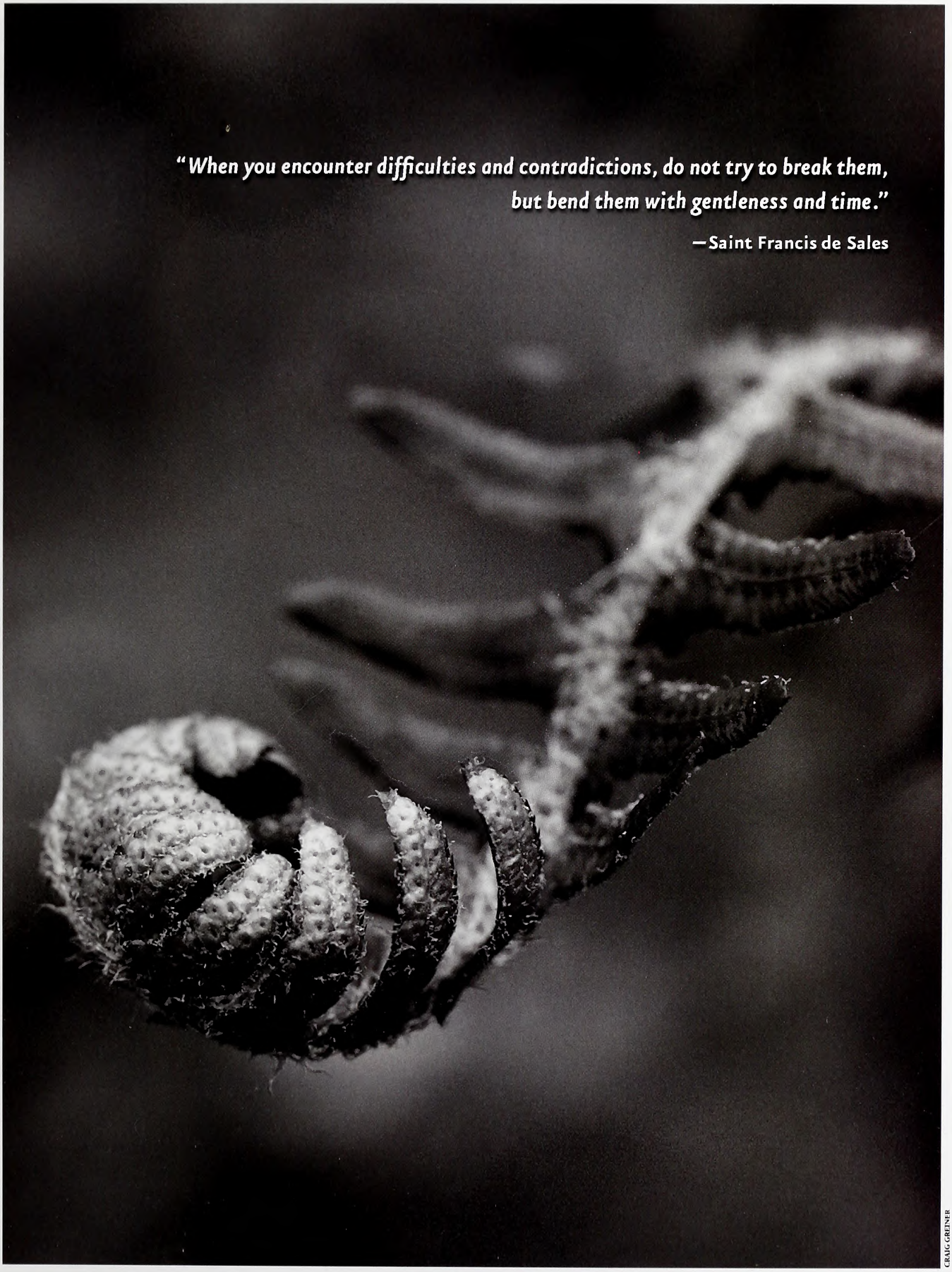
There invariably comes a time, however, when it matters less who catches the most or biggest fish. There's an old saying that fishermen go through three stages—at first, our goal is to catch the most fish; then the biggest and, finally, the most difficult. There's some truth to this and, as we grow older, most of us begin to replace that competitive zeal with something more satisfying.

We're more likely to fish with a self-imposed handicap simply because it pleases us. We choose tactics that are less effective knowing that we're limiting the size and numbers of fish we'll catch. We fish for bluegills with small popping bugs because it makes us happy, even though we could catch more, and bigger, panfish on catalpa worms. We chase bass with topwater lures when we know a Carolina-rigged soft plastic salamander would work better. This past spring, I had a lot of fun catching a bunch of smallish trout on miniscule size 24 midges even though I knew where to catch much bigger trout on nymphs a few miles down the river.

Some of my fishiest friends realize that the best fishing isn't always about size and numbers. On an unseasonably warm day last November just ahead of a cold front, Cam Cantwell, Amy Ellsworth and I were exhausted from a week of chasing albacore. Amy had already landed a 13-pounder on a fly rod, and she was flying back home to Idaho the next day. Instead of heading back to Cape Lookout, I suggested we rig three light spinning rods with bottom rigs, buy some fresh shrimp and drag our chairs and a cooler out on the beach.

"You've caught your 'applecore,' so let's enjoy what may be the last day of summer," I told Amy, "especially since it's about 12 degrees where you're headed."

We had the beach to ourselves, and we hauled in sea mullet and black drum as fast as we could bait our hooks. Finally, we ran out of bait and sat sunburned and sandy in the fading light, totally content. And since we were also covered with scales and dried slime, we were more than adequately fishy.



CRAIG GREINER

OUTDOOR MOMENT

fern

IN THE AUGUST ISSUE

F. EUGENE HESTER

WOOD AND WATER

Beavers fascinate and confound us with interesting adaptations and industrious building.

WHEN TREES TRAVEL

The reintroduction of an evergreen begs the question of when this is environmentally responsible.

BUGGING OUT

During the dog days of summer, fly-anglers can do well by using patterns that mimic terrestrial insects.

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WILDLIFE

A lone hunter afield makes for an iconic photo but a poor practice. Taking along a novice hunter helps preserve sporting traditions.

PHOTOGRAPH BY RUSSELL GRAVES.

Volume 73 | Number 8

WILDLIFE IN NORTH CAROLINA

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Cover: At turns respected and reviled, the industrious American beaver is a terrific water control engineer. PHOTOGRAPH BY F. EUGENE HESTER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

The dog days of summer make many outdoors enthusiasts just want to stay inside with a cold drink. That's understandable, but it's a shame for anyone to sit still during time that could be spent outdoors, or at least spent preparing for later outdoor activities. We have put together some ideas in this issue to get you either knee-deep in a cool stream, ready for hunting season, or both.

MELISSA McGAW/NCWRC

In "Summertime, and the Fishing is Terrestrial" (page 26), Elkin fishing guide Marty Shaffner shows us how to enjoy fly-fishing during the heat of the summer by using flies that mimic land-based insects such as ants, beetles and grasshoppers. Marty has spent enough time on the water to understand exactly what fish like to eat and when. Give his advice a try, and August might become your favorite fishing month of the year.

This month is also the ideal time to drag out your hunting gear and perform the maintenance many of us put off until the night before the first hunting trip of the year. Seasons for mourning doves, various marsh birds and Canada geese—as well as bow season for deer—open in just a few weeks, so a little preparation would not be premature.

While you are getting ready, think about taking along a new partner who has not been hunting before. Walter "Deet" James spends a lot of his time trying to convince experienced hunters to do just that. As the coordinator of the N.C. Wildlife Resources Commission's Hunting Heritage Program, Deet's job is to educate novices about the value of hunting and inform old hands how they can help reverse the decline of hunting participation. In "Mentoring for Hunting's Future" (page 20), he explains how crucial it is for longtime hunters to introduce newbies to the pleasures of hunting. Eventually, this type of mentoring could mean the difference between hunting's continued existence or its slow extinction.

We have even provided solutions to one of the main reasons people give for not hunting—lack of access to quality hunting land. In "Finding a Place of Your Own" (page 10), David Hart tells us how to lease or buy land, or simply ask landowners if we can hunt on their property. Using the information in this issue, you could enjoy a month of successful fishing and still be fully prepared for hunting season by the time Labor Day weekend rolls around.

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

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Don't Drill, Baby

I am nothing but thankful for John Manuel's article, "Plumbing the Depths," in the June issue. It is absolutely vital that North Carolinians realize the consequences offshore drilling could cause to our coastal environment. The damage already done to this important ecosystem is apparent, though rarely a topic of conversation. Fish can hardly be caught in the lower Cape Fear and swimming is considered unwise. Oysters cannot be legally taken within miles of where I live on the coast because it is physically dangerous to consume them.

The tragedy of the commons is all too evident in this situation. Gas prices impact each individual more so than fisheries being closed in small increments. It is time for us to re-think "drill, baby, drill," and look toward preserving our fisheries and coastal environment for my generation and the generations to follow.

Jake Thomason
Wilmington

John Manuel did his usual outstanding job with "Plumbing the Depths," a story about the potential problems and advantages of drilling for oil and natural gas off the North Carolina coast. He wrote a fair and balanced report.

As a former managing editor of *North Carolina Sportsman* magazine, I've had the opportunity to fish the Louisiana coast several times (NCS is owned by Louisiana Publishing). Anyone who has fished Louisiana waters knows why that state is called "the Sportsman's Paradise." One aspect of fishing Louisiana salt water that's quickly evident is the hundreds of offshore and inshore oil rigs that provide immense structures for baitfish, attracting game fish along with in-state and awed visiting anglers.

Of course, North Carolina's and Louisiana's coastlines are different, as are their sea bottoms. These states share only one common denominator — they're both in the flight paths of hurricanes. Manuel correctly points out that Hurricane Katrina resulted in the spillage of 17,652 barrels of oil from Gulf of Mexico drilling platforms. However, it's interesting to note that the Coast Guard doesn't consider an oil spill to be major unless 100,000 gallons of oil are released into the environment, so Katrina was not a cause of major oil spills. Apparently small oil spills are diluted by the large volume of sea water in oceans (many gallons of oil seep from the ocean floor each day but the environment disperses that seepage naturally). When a major hurricane is imminent, it's my understanding that oil workers immediately cap wells at the seabed, then pump the remaining oil in the line to holding facilities on land in order to prevent major spills. Apparently that happened successfully before Katrina hit New Orleans. In fact, most oil spillages caused by Katrina occurred at storage and processing facilities on land.

One must note, however, south Louisiana is called "the Cancer Belt" by local residents because of past lax rules in regulating oil and gas industries that produce pollution as byproducts. There is a higher than average incidence of cancer among Louisiana citizens living at those areas.

A second note: Louisiana's fabulous fishing is attributed mainly to a state government decision years ago to remove gill nets from almost all of its inshore waters, creating fabulous fisheries for red drum, speckled trout and many other saltwater species. Unfortunately, North Carolina's politicians haven't followed Louisiana's lead with respect to gill nets.

Craig Holt
Snow Camp

Delicious Fishes

I'll bet Bruce Ingram's well-written and informative article "So Happy Carp" (June 2009) surprised many a fly fisherman! And these anglers may be in for a couple more surprises when they find out the degree of skill and patience needed to score with these 1831 German transplants.

First, that needle-sharp barbed spine at the leading edge of the dorsal fin, and its counterpart on the anal fin, demand respect when handling carp of any size.

Then perhaps a more pleasant eye-opener: eating properly smoked carp. Find someone with a hickory-fired smoker who knows the tricks of this cooking method. The results rival smoked salmon — really!

Duane Raver
Garner

The article entitled "So Happy Carp" was very interesting. I have fished on the lakes in the Lake Norman area, and seen just acres of carp feeding along the shoreline, but could not get them to bite anything. The information from your article might help the next time I see some. I have also fished for bonefish in the Florida Keys, but I must confess not recently. The last time I was fishing down there, my friend and I were run off from our grounds because we were too near President Nixon's vacation home.

Craig Allen
Address withheld

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A GOOD PROBLEM to have

THANKS TO WILDLIFE MANAGERS, THE AMERICAN BEAVER LONG AGO RETURNED FROM THE BRINK OF EXTINCTION. AS A RESULT, IT THRIVES TODAY ACROSS NORTH AMERICA AND NORTH CAROLINA AS A SOURCE OF BOTH FASCINATION AND CONSTERNATION.

It was a dark, moonless night, the kind when you imagine werewolves are not too far from the tent, sniffing for blood. I was camped in remote turkey woods, listening to the incessant call of a whip-poor-will and the soft but somehow menacing hoot of a great horned owl.

Then there was a sound like someone had dropped a rock from a high place into the lake adjacent to the tent. Creature from the Black Lagoon? Sasquatch? I swallowed hard and quavered, "Did you hear that?" "Beaver," said my tentmate. "Go back to sleep." It had been a beaver slapping its tail in alarm — afraid of my buddy snoring in the tent. The beaver wasn't a prowling monster looking to make me a late night snack; to it, I was the threat. I fell asleep.

Those who create folklore have been busy as beavers fashioning a legacy of beaver tales. The largest North American rodents, beavers are, in American Indian myths, the most exalted of the rodents. According to Cherokee legend, the water beetle, grandchild of the beaver, scooped up some mud from the bottom of the lake-that-was-the-world, and the mud expanded to become the Earth. One theory is that the tale grew from contact with the Ice Age giant beaver, a Godzilla of beaverdom that weighed as much as 700 pounds and had 4-inch incisors — enough to nurture not only folktales but also nightmares.

Once, the beaver in North Carolina was in danger of becoming a blurry photo in an old history book. North Carolina reported its last native beaver in 1897, and it wasn't until 1939 that the state began to restore the species with 29 animals live-trapped in Pennsylvania. Fourteen years later the prolific beavers had expanded to an estimated 1,000 and spread into seven counties. Today most of the state has resident beavers, and there is a statewide open season on them, with firearms or bow and arrow allowed during any season for the taking of wild animals. Beaver trapping is legal from Nov. 1 through March 31, and it is legal to take beavers on private land year-round if the animals are destroying or damaging property.

The N.C. Wildlife Resources Commission's pamphlet "Beaver Management in North Carolina" is a treasury of facts about beavers, their good and bad habits, and species management and control. You can find trapping regulations at www.ncwildlife.org/pg02_Regs/2009_10_Trapping_Regs.pdf.

WRITTEN BY
JOEL M. VANCE

PHOTOGRAPHED BY
F. EUGENE HESTER

MISUNDERSTOOD NEIGHBOR

Castoreum, an oil produced by a beaver's anal glands, was prized by European cultures because it supposedly was both an aphrodisiac and a headache remedy—you could spend all day creating jokes from that combination. Today the oil is used in expensive perfumes as a fixative for more agreeable scents. My father was a perfume oils salesman and well might have dealt with beaver castoreum, but he had less pleasant contact with the entire beaver, finding out that it could repair a breached dam faster than he could get rid of it.

Specifically, a beaver dam flooded a low-water crossing on our farm, making it impossible for my father to get around. He breached the dam with dynamite, but it was repaired the next day. He finally gave up explosive remedies and put a drainpipe in the dam. He found the pipe plugged tight with corncobs and mud. That's when he resorted to trapping.

But as much damage as a beaver can do, it has positive value beyond its fur. It is a water control engineer. Beaver ponds are magnets for ducks and, in Northern areas, moose and deer. Beavers don't build dams to keep busy; they have a purpose. They are nature's urban developers, taking a stream too shallow for them and turning it into a nice, deep beaver pond in which they can build a condo known as a beaver lodge.

It's ironic, given that beaver restoration was a main goal of modern wildlife management, that the animals now are considered a nuisance in some areas. Arkansas has had a formal beaver eradication program since 1993 and pays bounties through county option. Missouri offers information on trapping nuisance beavers to landowners or help from a state wildlife damage control person. Ron McNeely, longtime damage control officer for the Missouri Conservation Department, wrote a manual on damage control, which the department offers free to pestered landowners. (One Massachusetts Internet outfit sells the booklet for $13.95.) Most of the advice is common sense: the larger the culvert size, the less likely it is to be plugged, and the fewer trees and other beaver-attracting plants, the less likely the area is to attract beavers in the first place.

Todd Menke, a wildlife biologist with the Wildlife Services Division of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service in North Carolina, sums up the professional wildlife scientist's attitude toward beavers: "As wildlife managers, we understand the value of beavers and how to help balance their damage so humans can coexist with them. We all want beavers to do what they do best and provide that valuable wetland habitat where they won't conflict with other resources."

Colleen Olfenbuttel, furbearer biologist for the N.C. Wildlife Resources Commission, says, "During drought, such as what we had in 2007–2008, landowners, including farmers, were able to take advantage of stored water provided by beaver-created ponds."

The beaver lodge mound of sticks and mud is the most visible sign of the chewers, but felled trees or stumps surrounded by a scatter of chips puts the stamp on it as well. Where water levels vary too much for a lodge, beavers burrow into a bank. That can be a real problem if they do it in a pond dam where a frog-choker rain could erode the beaver den and cause the dam to fail.

HOME IS WHERE THE HEART IS

A beaver dam is a marvel of wildlife ingenuity. The animals use small brush, hauled to the dam site in their mouths. They place the brush butt ends downstream and then scoop mud with their forepaws, carrying it to the dam (or lodge) to seal the gaps in the brush. It's a fiction that a beaver can fell a tree like an ace logger. They just chew until the tree falls—occasionally on the beaver.

A beaver's teeth grow throughout its life, and only by gnawing does it keep them worn down. Without chewing, the beaver's front teeth would grow so long the beaver couldn't eat and would die. So part of the beaver's legendary industry is a matter of dental necessity. The products of all that chewing are both food and shelter. Beavers are herbivores—they eat nothing but plant material. They eat the bark and cambium layer of small trees and also haul such material to their lodge as a winter food supply. Big trees can become part of a dam, and smaller ones get woven into the lodge, which has an underwater entrance, a common room and an air vent. Once inside, with a food supply, a beaver family can ride out the harshest winter in relative comfort.

The average beaver weighs 30 to 40 pounds, but some can top 70 pounds in their typical 12-year life span. Beavers have few natural enemies, other than man. "Alligators in the southeastern part of the state may take an occasional beaver or two, and a bear may take one, if caught on land," Menke says. "Snapping turtles may take a young beaver, and I know river otters like to use abandoned lodges to raise their young, but I doubt they actually take many young beavers when there is so much easier food available to them such as fish and crayfish, their preferred food."

Beavers breed in late winter and birth in early spring, with four kits the usual litter. They produce only one litter a year. A beaver lodge might have a parent pair, several juveniles and the newest litter. The young beavers stay at home for two or three years, but then the parents essentially tell them to get a job and run them out.

GUIDING THE WAY

Beavers are credited with leading early explorers farther and farther into what now is the

AS MUCH DAMAGE AS A BEAVER CAN DO,
IT HAS POSITIVE VALUE BEYOND ITS FUR.
IT IS A WATER CONTROL ENGINEER.

Industrious to the point of frustration for many humans, the beaver is a highly skilled builder. It uses its wide, flat tail to shape and pack the dams that it builds to create ponds for its preferred habitat.

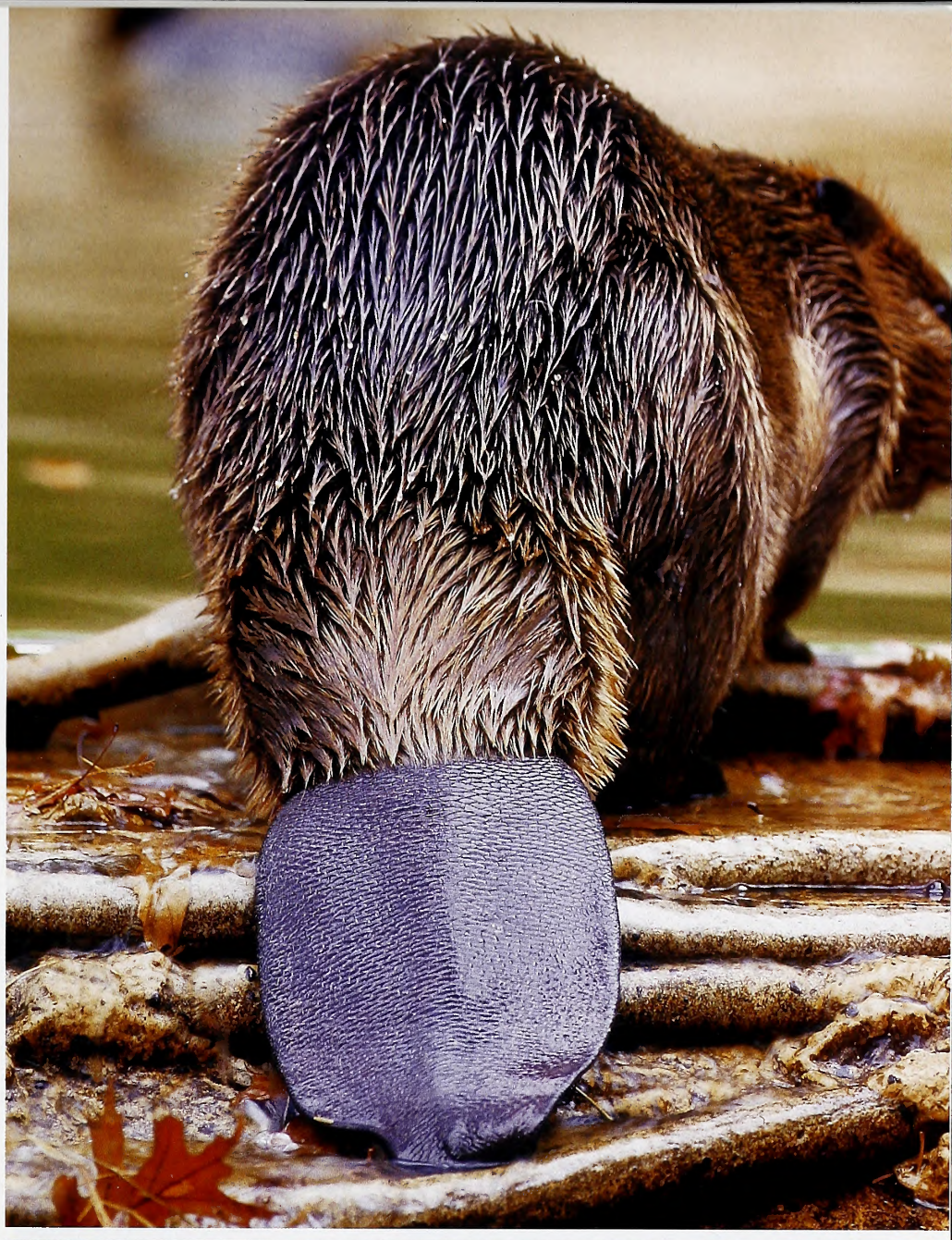
HELP IS AVAILABLE FOR BEAVER PROBLEMS

Beavers are responsible for many positive ecological impacts, but conflicts with humans sometimes arise. To handle beaver damage problems, the N.C. Beaver Management Assistance Program (BMAP) was created by state legislative action in 1992 to help private landholders, local governments, the N.C. Department of Transportation and others.

Under this program, wildlife specialists use proven beaver damage management techniques and equipment to alleviate beaver damage. Whenever feasible, nonlethal beaver removal techniques are recommended; however, lethal techniques are the predominant methods used. Wildlife specialists encourage landholders not to remove beavers if removal would result in little or no benefit. Due to practical and ecological considerations, the N.C. Wildlife Resources Commission does not permit the relocation of beavers within the state.

The program is run by the U.S. Department of Agriculture's Wildlife Services unit through a cooperative agreement with the Wildlife Commission. This cost-share program aids landowners in participating counties through funding from state, county, federal and private sources. It is estimated that for every dollar spent on BMAP, four dollars of resources are saved.

To find out if your county is enrolled in BMAP and how to get services, call 1-866-487-3297. If your county does not participate in BMAP, visit www.ncwildlife.org and click on "Coexisting with Wildlife" to explore other options.



Beavers gnaw to keep their teeth ground down (top), because the orange-colored incisors grow throughout their life. It is this driving force that helps them build the shelter they need to survive.

United States. Among the objectives of the Lewis and Clark expedition of 1804–1806 was to gauge the furbearer resources along the way. As trappers in the East ran out of suitable animals, there was only one direction to go: west. They moved over the Appalachian Mountains, into the heartland and ultimately farther west until, finally, there were few beavers left.

The beaver was a lure for explorers, entrepreneurs and settlers long before agriculture and other New World attractions. As early as 1653, a Dutch writer said the beaver "has attracted many persons to the country." Even earlier, in 1626, there was a shipment of beaver pelts from what now is New York to Holland's Dutch West India Company. The West India Company owed its existence to beavers, and in turn it attracted Dutch colonists to what they called New Netherland, which today is New York. The barter system flourished, and beaver pelts were prized barter items.

Beginning in the early to mid-1600s, beaver hats became the rage. European beavers had become almost extinct, so the seemingly endless supply of North American beavers seemed like a gift from heaven. By the beginning of the 1700s, beaver pelts from the North American colonies were flooding into the European hat trade. Still, it took a wealthy man to own a beaver hat. It's estimated that in today's money, such a hat would cost more than $500. With prices like that, it's no wonder trappers decimated the North American beaver population. The fad for beaver hats lasted through the 1700s and into the 19th century.

Yet even today, a beaver hide is money in the bank for a trapper. However, Olfenbuttel says, the sale of pelts is only part of the income from beaver trapping. "The figures don't include income from trapping activities for private landowners, timber companies, farmers and so forth, and they also don't include income earned by local trap stores in providing supplies. Last year, a new trap store opened up in Durham, partially fueled by demand for trap supplies to address beaver conflicts."

Beaver pelts mounted on hoops have become wall decorations worth $200 and up. You can buy a hoop made of walnut or oak for about $100, provide the pelt (either trap it yourself or buy one for about $150 or more), and mount your own rustic accessory. A beaver skin coat can cost thousands of dollars

NATURE'S WAYS

How Are Beavers Adapted to a Semi-aquatic Life?

See Nature's Ways, page 39.

IT'S A FICTION THAT A BEAVER CAN FELL A TREE LIKE AN ACE LOGGER. THEY JUST CHEW UNTIL THE TREE FALLS—OCCASIONALLY ON THE BEAVER.

—unsheared up to $4,000 in recent years, and sheared (with the long hair trimmed away, leaving the softer undercoat) $7,000 and up.

TAKING ANOTHER LOOK

Menke cites a host of positives from the presence of beavers. "Wetland habitat for many species of animals and plants has increased." He notes waterfowl use, especially by wood ducks. "Soil erosion is reduced, along with downstream sedimentation. Then there's water for irrigation, livestock and wildlife during drought as well as recreational, educational, economic and aesthetic opportunities." The cultural benefits to people are many and varied. Menke mentions the contributions to "hunting, fishing and trapping, as well as wildlife looking, photography, nature study and environmental education."

Of course, there's no ignoring the nasty flip side, when beaver activity results in flooded timber, agricultural land, homes, yards, septic tanks, sewage treatment facilities and roads; the girdling, cutting and flooding of commercial, ornamental and shade trees; damage to tree plantations; the failure of roadbeds, railroad beds and pond dams; degradation of culverts, bridges, spillways, overflow pipes and irrigation and stormwater ditches; the drowning of livestock; and losses from feeding on crops.

But no species is without its negatives, and sometimes people need help to deal with damage caused by beavers (see sidebar). If humans can learn to live with each other—often a difficult task—we should be able to live with an animal that has been around in one form or another almost since the world began. ◆

Joel Vance is the author of "Grandma and the Buck Deer" (softcover $15); "Bobs, Brush and Brittanies" (hardcover $25); and "Autumn Shadows" (limited edition, signed $45), all available from Cedar Glade Press, Box 1664, Jefferson City, MO 65102. Add $2 per book for shipping and handling.

Finding a Place of Your Own

Though it's not as easy as it used to be, finding great land to hunt is still possible with a little effort. Read on to find out what approach—beg, borrow or buy—might work best for you.

Written by David Hart | Illustrated by Tim Lee

It's getting tougher to find a place to hunt. North Carolina lost an estimated 300,000 acres of farmland in just the last five years and over 1 million acres of forest since 1990, largely at the hands of development and urban and suburban sprawl. That lack of access to quality land is the primary reason hunters are stashing their guns and leaving the sport. According to a 2005 survey conducted by Responsive Management, a natural resources research firm, 42 percent of hunters nationwide said "not enough access" and "not enough places to hunt" strongly took away from their hunting satisfaction.

The good news is that it's not impossible to find quality hunting land. According to the N.C. Department of Agriculture, there are an estimated 9 million acres of farmland throughout the state and an additional 18 million acres of private forest. Open space is generously scattered from the coast to the mountains. It may seem like every patch of timber and every corner of every farm has a hunter sitting in a tree stand, but there are still plenty of places to spend some time following your bird dog or hunkering in a blind. You just have to work a little harder to get permission to hunt those places.

Pay to Play

Or in some cases, you may have to shell out hard-earned cash. Leasing is a divisive issue, and many hunters refuse to pay to hunt. But for many farmers, timber companies and other landowners, leasing hunting rights is just one more way to help boost their bottom line. Just as cattle or timber can put more money in their pockets, the wildlife that lives on their land is an asset that has tremendous value. Agree or disagree, leasing is a permanent addition to the hunting landscape in North Carolina, and in many cases, if you don't offer money to hunt, someone else will.

Leasing actually has some huge advantages. Not only will you have the farm or woods to yourself throughout the season, you won't have to make payments on the land those eight months out of the year that you won't be using it. Under many lease agreements, you can still have the freedom to plant some food plots and undertake other wildlife-friendly work. You can come and go as you please, hunt as little or as much as you want, and you can bring friends and family. It's yours to hunt without the long-term expenses and the obligatory maintenance hassles.

The drawback? Even though you pay for exclusive rights to hunt, you may not be able to manage the land like you would if it was your own. That depends on the landowner, who can also place restrictions on vehicles and even the game species you can hunt. And even if you do have the freedom to improve the habitat, someone else might offer more money for the hunting rights next season. Some landowners do lease only a season at a time, but others, particularly individual landowners, might be willing to agree to a multi-season lease. By entering into a three- or five-year agreement, you'll have the peace of mind of knowing the place is yours at a predetermined rate for a set number of years.

Leasing can be expensive, but split the cost with a handful of close friends and you'll automatically cut your cost while still having a decent place to hunt. The price you can expect to pay can vary based on a number of factors. Land close to large population centers tends to cost more because more hunters are willing to pay. Areas known for big deer also command a higher lease rate, and so does land with a variety of game species.

So how much can you expect to pay? Ten years ago, it wasn't out of the question to find a good tract for about $5 an acre, but high demand for quality hunting opportunities has pushed that price up to as much as $20 an acre. That high rate is the exception and not the norm, and many landowners simply want to recover their property taxes, making leasing an affordable and realistic option.

Your Own Place

An alternative is to drop a down payment and buy your own place. The real estate market may be in a bit of turmoil at the moment, but that's nothing but good news for potential buyers. In other words, a hunter who wants his own place where he can plant food plots, hang tree stands, cut trails and maybe even build a home someday, can find a steal right now. No one is giving their land away, even with the market in a down cycle, but Mike Wessell, a recreational-land broker from Raleigh, says raw land prices are starting to fall.

"I know of some land that isn't suitable for developing that's going for around $500 an acre now. It's pretty much swamp, but it can be a great place for duck or deer hunting," he noted. "Generally, land in the Piedmont or near large urban areas is going for $2,000 to $3,000 an acre, but even that can vary with the size of the tract or the development potential. Areas known for producing big deer are also a little more expensive."

The advantages of buying are numerous: You have complete control over management activities, and you won't have to worry about someone else taking the hunting rights away from you. You can invite your best friends for an afternoon hunt, and if you live on the land, you can send your kids out the back door for a Saturday morning hunt, and you can watch deer and turkeys from your kitchen window throughout the year. Best of all, you'll make money if you ever decide to sell. The market may be soft now, but according to Wessell, land values will eventually increase. They always have, at least over the long term.

Even if you never sell, your children will have the option of turning the land into cash after you've passed it on to them. There's a good chance it will be worth a whole lot more than what you paid for it. "You can always put your money in the stock market, but you certainly can't hunt on it or enjoy it any other way. Land values will continue to stay strong, and recreational land will hold up real well, no matter what happens to the economy," insisted Wessell.

He added that many hunters are forming limited-liability corporations with a couple of close friends in order to put more money into larger chunks of land. That can, however, lead to some potential problems. What if one partner wants to sell or is having trouble paying his share of the mortgage? Those issues can be addressed in legal documents. It's always a good idea to involve a lawyer any time a large amount of money and a group of individuals are involved.

Knocking on Doors

Another option, one that won't cost you a dime, is simply to ask for permission to hunt. It's getting tougher these days, thanks largely to the popularity of leasing and the continued loss of open space to development, but plenty of hunters have a great place to chase deer, quail and other game because they just bothered to ask. It's tough, but not impossible, said Ramon Bell, a dedicated bow hunter from Stokesdale.

Bell used to belong to a lease, but he stopped paying to hunt when he switched from gun

hunting to bow hunting. That alone has helped him gain permission on dozens of properties because many landowners are leery of hunters who use a rifle or shotgun. Those same landowners are far more willing to grant permission to someone who wants to use a bow, said Bell. It also helps that he successfully completed a North Carolina Bowhunter's Association safety certification program, as well as an International Bowhunter Education Foundation safety course and a state hunter safety course. Those can help quell any safety concerns, but the main reason Bell has plenty of places to hunt is his outgoing personality. In other words, he's not afraid to ask.

"What's the worst thing that can happen?" he wondered. "That they might say 'no,' but they might say 'yes.' If you don't get the answer you want to hear, move on to the next one and try again. No harm done."

Bell talks to people every chance he gets, whether a complete stranger in line at the grocery store or a friend of a friend at a social gathering. He'll simply ask if they own land. If they do, he'll come right out and ask if they allow hunting. Many don't, but sometimes they say yes, and Bell now has more places than he could ever hunt in a season. Some places are just a few acres, but that's plenty of room for a bow hunter. He's taken countless deer over the years from large farms and tiny tracts sandwiched between houses.

Brandon Price agrees that there's no better way to get permission than to build up enough courage to ask. As the chairman of the Central Carolina Chapter of Quail Unlimited, he's always on the lookout for a new place to turn his bird dogs loose, and he occasionally knocks on strangers' doors and asks about hunting. He admitted that it's getting tougher, especially if you don't actually know the landowner, but it's not a lost cause, not by any means.

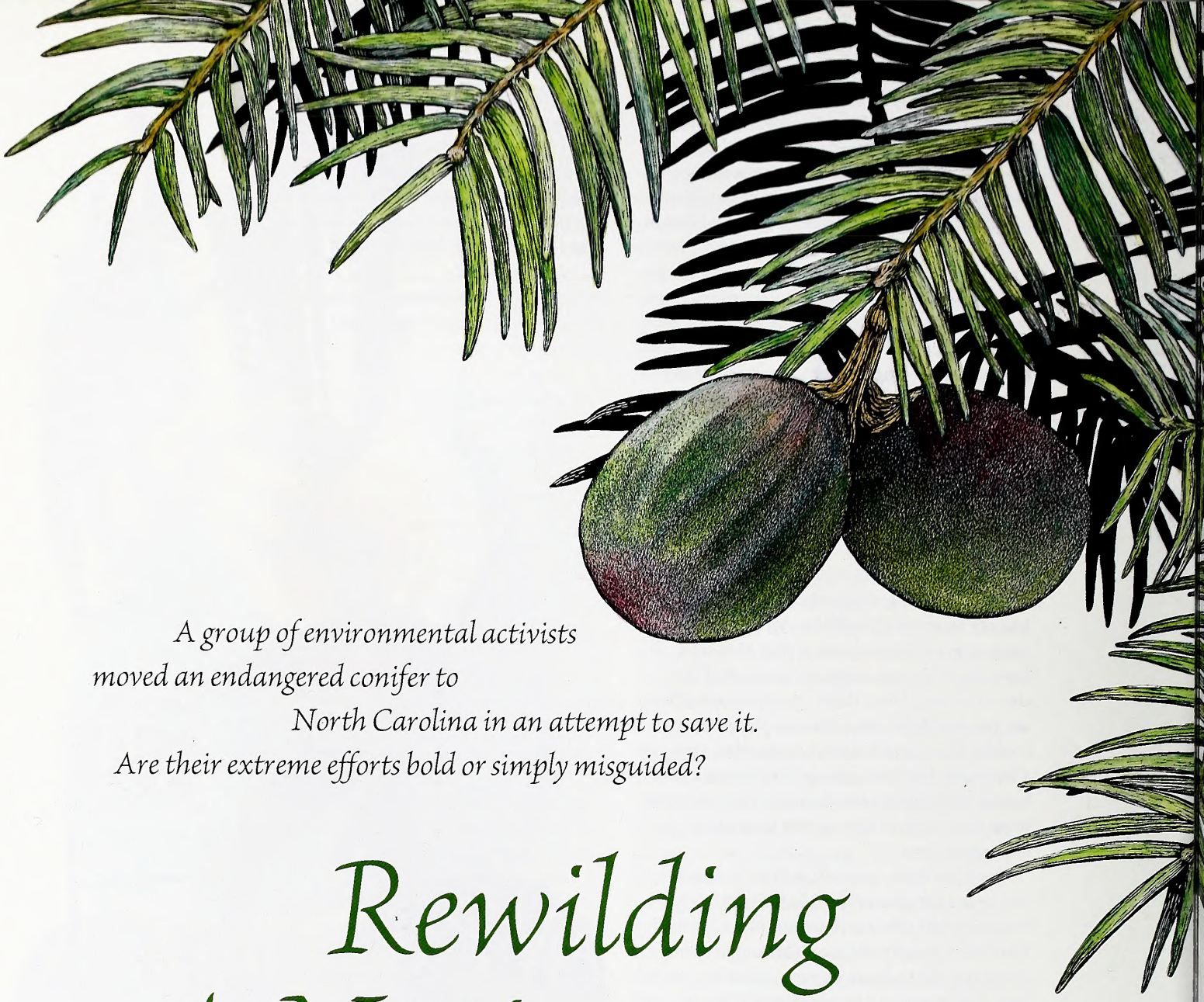
"It's much easier to get small-game hunting permission after deer season has ended. A lot of landowners either lease the deer rights or give permission to hunt deer to friends or family, but not a lot of people hunt small game," he said. "I ask if I can hunt for the day instead of asking for open-ended permission, and I make sure I let them know I won't leave gates open or drive across their fields."

Permission for squirrels or rabbits now can be the foot in the door for more hunting opportunities in the future, agreed Bell and Price. If you do get permission, stop in after you hunt to thank the landowner again. Genuine gratitude goes a long way. Offer to share the bounty, maybe even follow up with a thank-you note after the season has ended. Few hunters bothered to do that a decade ago, but then, few hunters had any problem finding a place to hunt. Times have changed. It's going to take a little more effort and maybe a little money to snag a place to spend some time with a gun in your hands. These days, you have to do whatever it takes to find a place of your own.

David Hart is an outdoors writer living in Rice, Va., and an occasional contributor to WINC.

Who Owns What?

Many tracts of rural land are owned by corporations or absentee owners, which means locating a specific landowner can be a chore. Thankfully, many county governments have tax maps online, allowing you to find those landowners without burning a tank of gas and knocking on countless doors. In many cases, you can search properties by address or even GPS coordinates, or by scrolling across tax maps that show property boundaries. You'll find the tract's size as well as the landowner's name and address. Once you locate them, drop a short note asking for permission to hunt. You never know unless you try. Some tax maps even include contour lines and aerial photos, which can offer a quick glimpse of the property's physical characteristics and habitat quality. Simply enter a specific county into Google's or Yahoo's search engine and navigate your way to the county's tax department.



A group of environmental activists moved an endangered conifer to North Carolina in an attempt to save it. Are their extreme efforts bold or simply misguided?

Rewilding A Native

Written by Sidney Cruze
Illustrated by Patricia Savage
Photographed by Melissa McGaw

Time has not been kind to *Torreya taxifolia*, a slow-growing federally endangered conifer known for the sharp scent its needles release when they are crushed. Fossils of branches and leaves lead botanists to speculate that the tree once blanketed the southern Appalachian Mountains. Now struggling for survival, it is confined to a narrow strip of habitat in southern Georgia and along the eastern banks of the Apalachicola River in northern Florida.

But *Torreya*'s luck might be changing. Last summer an activist group called the Torreya Guardians planted 31 *Torreya* seedlings near Waynesville in an effort to save the species from global warming's onslaught. They believe that moving the tree north will increase its ability to produce seeds. Though it will take years to determine whether the group is right, their work highlights what is fast becoming a pressing question for the conservation community: In the face of human-induced climate change, when is it okay to interfere with nature in order to save it?

Glacial relict

The nation's largest *Torreya taxifolia* grows in Warren County, on a Ridgeway farm near Norlina. Historians believe Congressman Weldon Edwards planted it on his Poplar Mount plantation in the mid-1800s. Photos reveal that more than a century later, the evergreen stood 53 feet tall, with a 45-foot crown. Over time the large branches died, leaving the tree a thin, gnarled shadow of its former self.

The wild *Torreya* population has suffered a similar fate. In the early 1900s approximately 600,000 of the trees lived in the wild, where healthy adults grew as tall as 60 feet and up to 3 feet around. The species began dying during the 1950s, and by the mid-1960s, the adult trees were gone. Botanists suspect several different fungi are partially to blame. *Torreya* was added to the federal Endangered Species List in 1984, and today fewer than 1,000 specimens survive. Unfortunately, almost all are stunted saplings that cannot produce seeds. Most of them grow in the Florida steepheads, deep ravines that slice through the bluffs on the Apalachicola River's eastern bank.

Torreya belongs to the ancient yew family. The most recent fossils from the genus *Torreya* come from the upper layer of rock formed during the Cretaceous period—100 million years ago. They were found in North Carolina and Georgia. During the last Ice Age, which peaked 18,000 years ago, plants from the Appalachian Mountains migrated south as the ice sheets advanced. Many of these plants, *Torreya* included, found refuge in the moist, shady steepheads, where they remained after the glaciers receded. *Torreya* is now endemic to its Apalachicola habitat. Many consider it one of the world's most endangered conifers.

Torreya expert Robert Nicholson speculates that although the reasons behind *Torreya*'s decline are complex, global warming is likely a factor in its current situation. "If you look at the tree's geologic history, it is more at home in cooler habitats," Nicholson says. "By settling in this cool, moist place, it has positioned itself as a canary in the coal mine. Rising temperatures will have an impact on the tree."

The nation's largest *Torreya* still stands in Norlina at around 150 years old, but it definitely was in better health in the early 1970s (inset).

CLAY NOLEN

Deep-time perspective

Conservation activist Connie Barlow encountered her first *Torreya* while working on her 2001 book "Ghosts of Evolution." After exploring the role the steepheads played in preserving the biodiversity of present-day North American forests, she began examining *Torreya*'s plight from the perspective of geologic history, or deep time.

In her book, Barlow proposes that millions of years ago, *Torreya taxifolia* got trapped in the Florida panhandle because it lacked a seed disperser. She suggests the tree would have moved north under ideal circumstances. She expands this theory in a 2004 article, "Bring *Torreya taxifolia* North—Now," published in *Wild Earth* magazine. Together with co-author Paul S. Martin, Barlow asserts that global warming will further decrease the tree's chance of survival, if it stays where it is. The writers call for moving the tree north to the Southern Appalachians in order to save it.

Already there is mounting evidence that the tree can succeed in North Carolina. A small grove has thrived in Asheville's Biltmore Gardens for more than 65 years. Bill Alexander, Biltmore's forest historian, agrees with Barlow about moving *Torreya* and believes our state will make a suitable habitat for the tree. "It's been planted in private gardens for at least 100 years, and it's not known to be invasive," he says. "Plus, it's unlikely to survive in the wild."

The U.S. Fish and Wildlife Service administers an official recovery plan for endangered species. Scientists are working to preserve wild *Torreyas*, clone the genotypes and then replant the offspring in or near the tree's native habitat. But Barlow believes more must be done now to save the tree. Landowners can legally plant *Torreya* on private property as long as the seeds come from private stock, and for Barlow, this looks like the best solution. Because *Torreya* represents a tree that has survived on Earth for millions of years, she says, moving it is grounded in an effort to save biodiversity. "*Torreya* is really a symbol of the increasingly difficult decisions conservationists will face as they try to decide what is native and what interventions will be used to preserve this biodiversity," she adds.

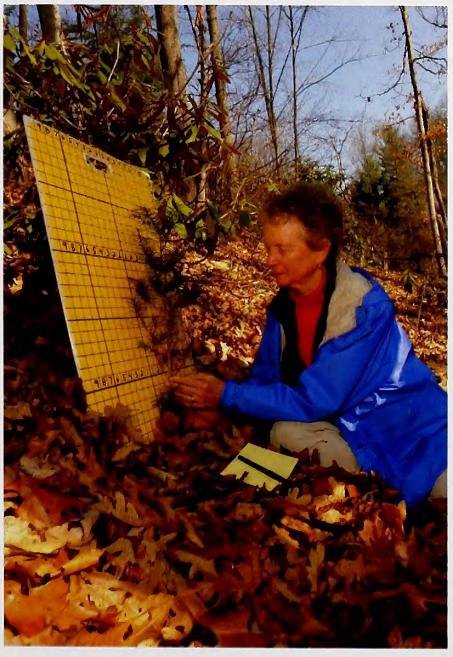
Rewilding in North Carolina

In 2004 Barlow formed Torreya Guardians (www.torreyaguardians.org), an all-volunteer Web-based group dedicated to saving the tree. She wanted to engage citizens in *Torreya*'s predicament and create a forum for discussing the pros and cons of moving the Eastern species of this genus north. "I wanted to move the debate forward and provide a model for citizen naturalists, even those who disagree, to prove you don't have to be an expert to do something useful. It is possible to take action on behalf of one species."

Group members include scientists, botanists, horticulturists and ecologists—not all of whom share Barlow's commitment to planting the tree outside its native range. Waynesville horticulturist Lee Barnes focused his dissertation on propagating *Torreya* with tissue culture. He joined the group early on and agreed to help disperse seeds to botanical gardens and private land-owners in the Southeastern Appalachians. Biltmore's Alexander, also a member, collected and donated 310 seeds to the cause. But the Biltmore supply of *Torreya* seeds isn't guaranteed. Last fall Alexander reported that because of the drought, the garden's trees produced no seeds at all.

The project still has a way to go. "I think less than a dozen have done well," Barnes says. "The seeds need to go through freezing and thawing cycles to germinate, and we tried to do that in a refrigerator. We're now learning from the Atlanta Botanical Garden how to improve our technique, so we hope to send more seeds out."

Meanwhile a small group of Torreya Guardians began planning a "rewilding" that would bring the tree north. They located a South Carolina nursery with 30 seedlings, all propagated from the champion tree in Norlina, and started looking for planting sites near Waynesville, so Barnes could monitor the trees and collect seeds.



Left, Linda McFarland of the Corneille Bryan Native Garden measures the growth of a *Torreya* seedling at the Lake Junaluska garden. Horticulturalist Lee Barnes checks a seedling named for conservationist Maxilla Evans planted at the Evans family's Waynesville property.

Small metal tags mark seedlings that were planted by the Torreya Guardians and named after different conservationists.

Waynesville resident Sara Evans joined the Guardians after meeting Barlow. "When I heard about Connie's love for *Torreya* and her plans to move it," Evans says, "I felt a deep connection to her." Evans' mother, Maxilla, had a similar passion for *Shortia galactifolia*, an evergreen perennial called Oconee bells for its distinctive white flowers. In 1990 Maxilla helped establish the Corneille Bryan Native Garden, a 1-acre preserve located near Lake Junaluska that is home to 500 species of trees, shrubs and other plants. Evans now lives on her mother's land for half the year. When she learned the Guardians were looking for planting sites, she quickly volunteered her property and the Bryan Garden.

On July 30, 2008, 11 volunteers gathered at the Lake Junaluska garden to plant 10 *Torreya* seedlings. Linda McFarland, chair of the garden's board of directors, was one. "When I first heard about the planting, I thought it was a nice opportunity for the garden," she says. "But the more I learned about it, the more compelling it became. The debate over how to preserve plants, which includes reintroducing *Torreya*, captured my attention. It's interesting to be a part of it."

The garden sits at 2,600 feet above sea level, in a shady ravine surrounding a stream fed by seeps and springs. Eight of the seedlings were planted on east-facing slopes, in the understory. The other two were planted in sunnier locations, so the Guardians could compare the trees' progress. "We chose these two microclimates intentionally so we can give people advice on where *Torreya* will grow and thrive," Barnes says. The group planted both male and female trees, spacing them so they could cross-pollinate. "Our goal is for them to be healthy in five to 10 years, when they will likely produce seeds," Barnes says.

With those seedlings in the ground, the group caravanned to Waynesville to plant 21 more—including one from the Atlanta Botanical Garden—on Evans' land. The mountainside property sits higher than the garden, at 3,400 feet, so the Guardians will compare the two elevations. It too has different microclimates, some shady and moist, others sunny and drier. Now each is home to a *Torreya* seedling.

Barlow photographed the trees and, in the spirit of Jane Goodall, gave them names instead of numbers. Each seedling bears an inscribed silver tag in honor of a conservationist. Walking among them you will encounter John Muir, Rachel Carson, Annie Dillard and Maxilla Evans.

Conservation controversy

By actively rewilding *Torreya* in Waynesville, the Guardians became the first group in the country to attempt "assisted migration," a controversial practice of moving a species to save it. Amidst mounting evidence that plants and animals are already trying to escape to cooler climates to survive global warming, scientists are considering the possibility that without human help, many may not be able to make the move. There are too many obstacles—cities, highways, bridges, farms—in the way. Assisted migration, once dismissed by conservationists may become a tool they rely on to avoid extinction.

Torreya expert Nicholson, the conservatory manager at Smith College's Botanic Garden, is among those experts who believe humans should take steps to help plants and animals survive global warming. "We've always impacted the landscape, and there will have to be more management from us in the future," he says. "We have to figure out how to do that."

Not everyone agrees that moving species is the best strategy. Biology professor Mark Schwartz of the University of California-Davis has studied *Torreya* for 20 years. In his article "Conservationists Should Not Move

LEARN MORE

Assisted migration has been covered in scientific literature and the popular press. A working group sponsored by the National Science Foundation plans to release recommendations related to the issue later this year. For information, visit www.nd.edu/~hellmann/MRWorkingGroup/Managed_relocation.html.

The group planted both male and female trees, spacing them so they could cross-pollinate. "Our goal is for them to be healthy in five to 10 years, when they will likely produce seeds," says horticulturist Lee Barnes.

***Torreya taxifolia*, an evergreen conifer tree, features large seeds and needles that emit a strong scent when crushed. Above left, structures of a male tree, and right, a developing fruit on a female tree.**

Torreya," which appeared alongside Barlow's in *Wild Earth*, he argues that far too little is known about the consequences—intended and otherwise—of assisted migration, and he insists the practice should be undertaken with extreme caution. He believes that assisted migration should take place only when extinction is imminent, after conservationists have exhausted efforts to revive native populations. Instead of moving *Torreya* north, Schwartz counters, now is the time to explore local solutions.

Peter White, director of the N.C. Botanical Garden, is another expert who views assisted migration as an extreme strategy for saving plants. "When do you abandon hope of preserving nature where it is?" he asks. In the case of *Torreya*, White agrees with Schwartz. He thinks moving plants can be useful but believes assisted migration should be done as part of federally administered recovery plans. A better strategy, he says, is to preserve genetic diversity in seed banks, because it is easier and cheaper.

The debate over global warming is a useful one, he adds, because it raises the issue of the role that humans play in shaping our environment. "The effects of global warming are hard to predict," White says. "Some plants might thrive. Up until now, it's been survival of the fittest. Now, how do we filter out man's role and then let the fittest survive? Assisted migration gets at the heart of the question: What is man's role, and what is nature's role?"

For Rob Evans, a plant ecologist with North Carolina's Plant Conservation Program, assisted migration sounds a number of alarms. He too believes conservationists must first do everything possible to preserve plants in their native habitat, and he cautions against encouraging private landowners to get involved in moving plants. "How do you decide which plants to move and why?" he asks. "Sometimes individual efforts take away from urgent conservation needs. People with the best intentions can move things around and strongly affect natural dynamics in a way that creates problems." Although *Torreya* is a native species, there are numerous examples of introduced non-native invasive species such as kudzu and Japanese stiltgrass that are choking native ecosystems.

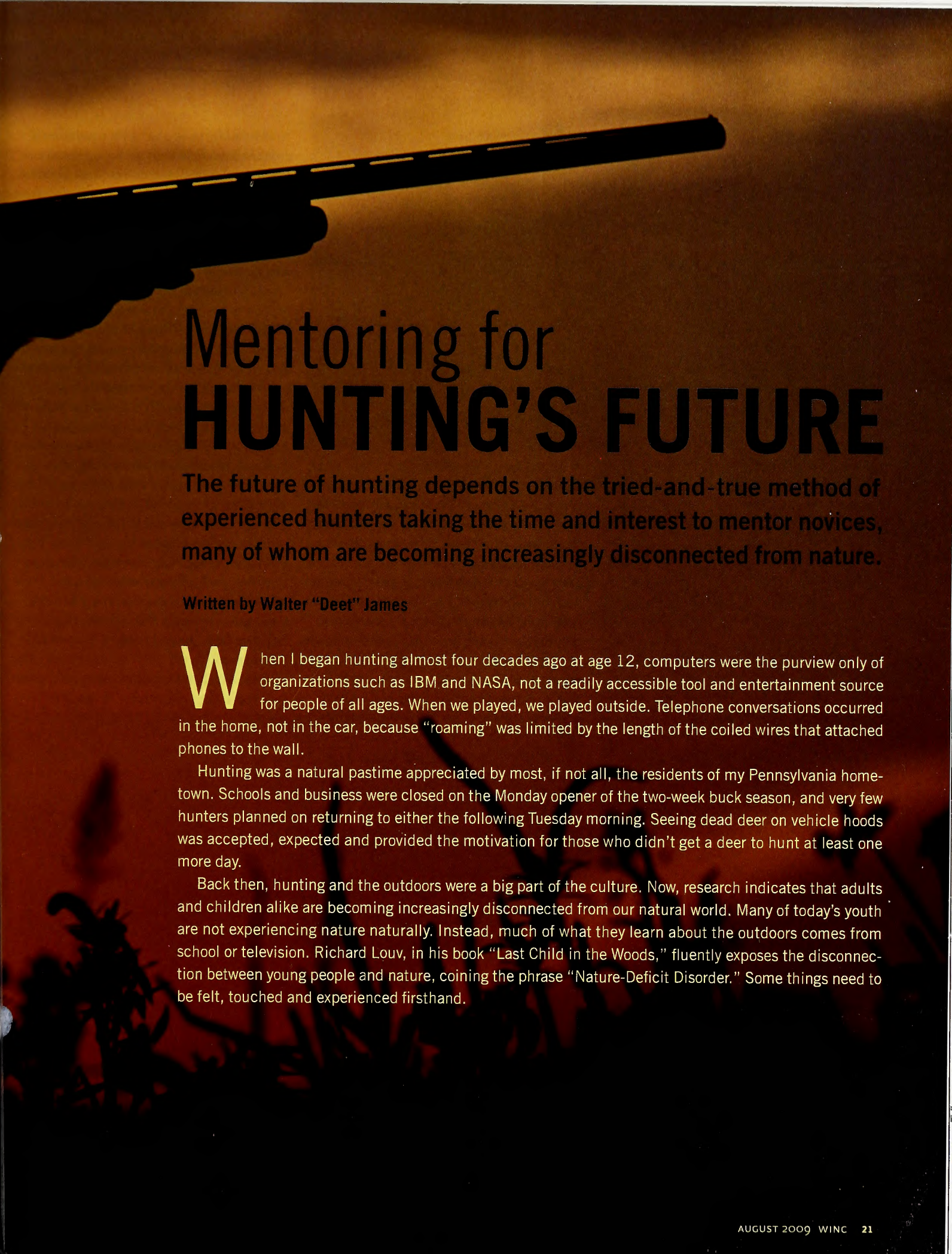
Barlow is well aware of the potential for such ecological disaster, yet she still believes that rewilding *Torreya* in North Carolina is the right thing to do. "It's not introducing a new species, but returning a deep-time native to the state," she says.

As of April 2009, 30 of the rewilded seedlings were growing. Those planted in sunny, drier locations showed signs of sunscald, but the others looked healthy. Many had sprouted new growth, and all measured close to 18 inches tall. Because the trees were planted during the drought, Barnes watered them weekly for a month, but he has since left them alone. The Torreya Guardians plan to monitor the seedlings, without helping them, as long as they are alive.

By taking action on behalf of *Torreya taxifolia*, the Torreya Guardians provide a fascinating case study on assisted migration. Only time will reveal the lessons we can learn from it. From the start, Barlow has embraced the debate over how far we should go to preserve *Torreya*—and our environment—in the face of climate change. For her, it all comes down to a commitment to save this prehistoric species. "If this is really what this tree needs, and it works," she says, "I will be able to help a species with tremendously ancient roots to survive."

Sidney Cruze is a freelance writer who lives in Durham. She writes about land conservation and sustainable agriculture in North Carolina.

RUSSELL GRAVES



Mentoring for HUNTING'S FUTURE

The future of hunting depends on the tried-and-true method of experienced hunters taking the time and interest to mentor novices, many of whom are becoming increasingly disconnected from nature.

Written by Walter "Deet" James

When I began hunting almost four decades ago at age 12, computers were the purview only of organizations such as IBM and NASA, not a readily accessible tool and entertainment source for people of all ages. When we played, we played outside. Telephone conversations occurred in the home, not in the car, because "roaming" was limited by the length of the coiled wires that attached phones to the wall.

Hunting was a natural pastime appreciated by most, if not all, the residents of my Pennsylvania hometown. Schools and business were closed on the Monday opener of the two-week buck season, and very few hunters planned on returning to either the following Tuesday morning. Seeing dead deer on vehicle hoods was accepted, expected and provided the motivation for those who didn't get a deer to hunt at least one more day.

Back then, hunting and the outdoors were a big part of the culture. Now, research indicates that adults and children alike are becoming increasingly disconnected from our natural world. Many of today's youth are not experiencing nature naturally. Instead, much of what they learn about the outdoors comes from school or television. Richard Louv, in his book "Last Child in the Woods," fluently exposes the disconnection between young people and nature, coining the phrase "Nature-Deficit Disorder." Some things need to be felt, touched and experienced firsthand.

F. EUGENE HESTER

Hunting provides the unique opportunity to interact with nature in a way that cannot be offered elsewhere in modern society. It links us to nature in a way that helps us realize that we are part of something much greater than ourselves. This knowledge of and connection to our natural world cannot be gained through advanced technology, concrete or steel. It can be gained only through direct interaction with nature. Hunting provides that exceptional interactive experience.

Recruitment and Retention

For many years, I had no idea that there was a problem with the recruitment and retention of hunters. Perhaps my obliviousness toward the national decline of hunters had something to do with the full parking lots I encountered over the years at state game lands near my hometown. A short gun season for deer tends to promote that illusion. Despite being an active hunter education instructor and assisting in various youth field days, I still refused to acknowledge that participation in hunting was declining.

But it most certainly is. Responsive Management is a public opinion and attitude survey research firm specializing in natural resource and outdoor recreation issues. It recently reported that roughly 5 percent of U.S. citizens, representing some 14–18 million people, hunt on an annual basis. But as the U.S. population continues to increase, hunters represent a lower percentage of the population. According to the 2006 U.S. Fish and Wildlife Service National Survey of Fishing, Hunting and Wildlife-Associated Recreation, hunters age 16 and older declined roughly 10 percent from 1996 to 2006. Unless those who love and value hunting take action to reverse this trend, it is likely to continue.

Over the last decade, a great deal of research has been dedicated to the national decline of hunting. The research indicates that three factors are the main barriers to hunting participation—the top factor being an aging hunter population. Baby Boomers, those people born in the period after World War II, represented the largest growth in hunter numbers up to and during the 1980s and still represent 44 percent of the hunting population in the U.S. Another factor is lack of time. Family obligations and demanding schedules often allow little flexibility. The third major factor is lack of access. Many of the weedy fields and woodlots hunters enjoyed over the years have now been developed into dwellings, strip malls, parking lots and roads.

We have become disconnected from hunting by finding ourselves too old, too busy and too far from hunting lands. I would bet that if every hunter were polled, many more reasons would float to the surface. Except for one, that is: the individual hunter.

The Mentor

Current hunter recruitment and retention research tends to reach for anything that has not been tried before—the "silver bullet," if you will. However, there is little need for a new solution. We already have a tried-and-true method to reverse the trend of declining hunter numbers—mentoring.

A lot of focus is placed on youth hunts, conservation field days and related outdoor family events designed to introduce children to hunting. These events are excellent starters for developing interest in the outdoors, but only mentoring can provide the long-term commitment and support needed to develop passionate, lifelong hunters.

My uncle Bill introduced me and my brother to hunting and fishing. I didn't realize it back then, but Uncle Bill was slowly building an outdoor foundation in his nephews that would last a lifetime. My brother and I were seeing all kinds of wildlife and everything nature had to offer. It was not a movie or a video game that provided the background, it was Uncle Bill and the outdoors.

Uncle Bill was married and had three children of his own who were too young to hunt at the time. He had a job and family responsibilities, yet still he made time to take my brother and me hunting. Several years later, my uncle changed jobs and had to move away. However, the hunting seed was planted, nourished well, and left to grow in my brother and me. And that it did. We developed a hunting identity and became part of the hunting culture.

Those early hunts were some of the greatest experiences of my life—hunts that were successful whether the game bag was filled or not. Stories of the day's events filled the air on the journeys home and continued long into the night. The post-hunt evening was spent contemplating future hunts as the wonderful smell of Hoppes' No. 9 cleaning solvent wafted through our home.

Even if we are unable to go hunting ourselves at times, we can share the great stories we've accumulated over the years with anyone willing to listen. Sharing our hunting stories with others can also be a mentoring experience that could inspire someone to go hunting themselves or at least to develop a deeper respect for those who do hunt.

I particularly remember one bear hunt during the mid-1990s. It was a cold, overcast November morning with 6 inches of snow on the ground. As usual, I was anxious to get on my stand as fast as possible. En route, I came across an aging hunter stopped along a trail deep in the hollow I was traversing. The gentleman carried a well-worn lever action rifle that had obviously seen many a hunting season.

We shared a greeting and he asked where I was headed. I pointed straight up the ridge and he smiled, saying, "I remember those days." He began to tell me of past hunts, and went on naming places and wildlife he saw during those long-ago hunts. I was so mesmerized by his tales that my rush to get on my stand was over. We chatted for some time and I walked away much better for the experience.

Hoarding Alone or Sustaining Together?

As we grew into adulthood, my brother continued to hunt in the company of others, enjoying the camaraderie of the hunt. Camaraderie is a much-cherished aspect of the hunting culture for many. It can be the glue that keeps hunters engaged in the activity.

I tended to be a loner, intentionally seeking seclusion in the woods. I'm not alone in my quest for tranquility. Hunting can provide an incredible experience for anyone seeking solitude from a world of crowds and technology. On many forays, I have thought that if only I could erase the distant traffic sound or the occasional overhead plane, then I would truly have a little bit of heaven on earth to myself.

Although the allure of solitude is great, so is the desire to leave an inheritance of some kind to future generations. I remember many hunts where I watched a spectacular sunrise or sunset, or took a fine turkey, deer, rabbit or squirrel. I also remember embracing snow, sleet or rain and thinking, *I hope there never comes a day when someone cannot enjoy what I'm enjoying right at this moment.* That contemplation alone is reason enough to not selfishly hoard my passion into oblivion. No matter how overwhelming the quest for solitude in nature, it is not worth the price of losing the hunting tradition.

I have come to realize that my desire for woodland tranquility is not going to contribute to hunting's future. Nor will it contribute to my giving back to hunting and the

FUNDING FOR CONSERVATION AND MANAGEMENT

Although fewer hunters are actually spending more money as compared to those in past years, the continual downward trend of hunters could impact future conservation and wildlife management initiatives. In fact, the value of the contributions that North Carolina hunters make towards wildlife management and conservation cannot be overlooked. Recent surveys indicate that North Carolina hunters contributed $431 million to the state's economy in 2006 in the form of hunting-related expenditures. Nationally, hunter expenditures are nearly $23 billion.

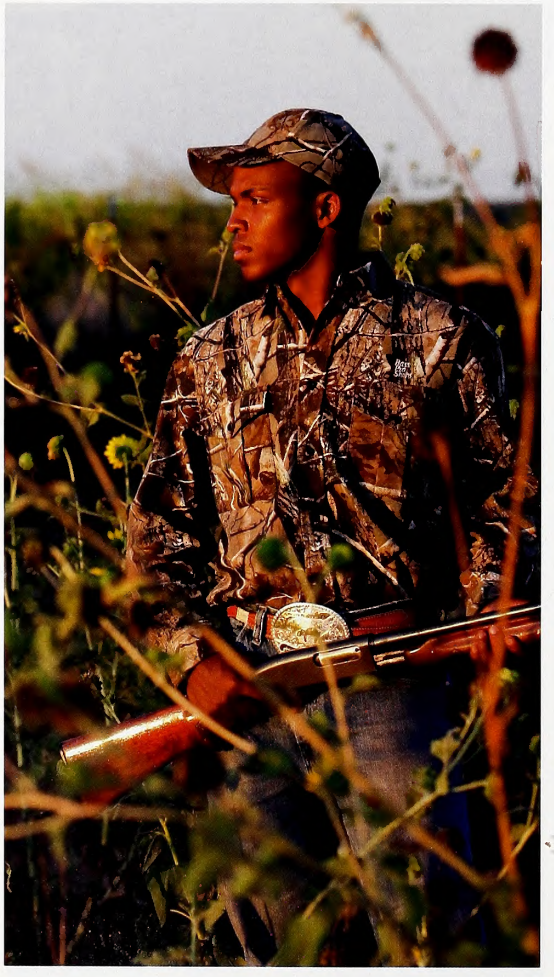
The funding provided by hunters represents the backbone of science-based wildlife management and conservation as we know it. Therefore, if the number of hunters continues to decline, so will funding for conservation.

NATIONAL RIFLE ASSOCIATION

F. EUGENE HESTER

RUSSELL GRAVES

RUSSELL GRAVES



RUSSELL GRAVES

precious memories it provided me. Moreover, what legacy can be passed on unless through a gift to someone else? What if my Uncle Bill had enjoyed the same pursuit of solitude in the woods as I did for so many years and had not shared it with his young nephews?

Hunter education teaches us, along with many other important things, that hunters evolve. Bob Norton's book "The Hunter: Developmental Stages and Ethics" details five distinct developmental stages of hunters. The stages, from novice hunter to veteran outdoorsman, include 1) shooter, 2) limiting out, 3) trophy hunting, 4) method hunting and 5) sportsman. Not all hunters pass through all of the stages, nor do they all reach the final stage.

In the sportsman stage, hunters reach a point where there is a heightened appreciation for nature and wildlife. In the sportsman stage the experience and process, rather than just the taking of game animals, becomes the essence. More importantly, the need to share and pass down the experience and tradition with other hunting companions is sought after and therefore becomes the ultimate goal. Similarly, hunters who reach the sportsman stage usually do so because the understanding gained in nature through the hunting experience is so powerful and valued, that not sharing it seems almost selfish by comparison. If hunting is to survive into the future in our modern world of disconnection, dedicated hunters cannot afford to isolate themselves into oblivion.

For families that continue to be passionate about hunting, none of the commitment and sacrifice of educating young hunters has changed. Young hunters are still recruited, firearms passed down and memories of times in the outdoors still cherished. Overall, however, hunter recruitment and retention is different today, and the need for hunting mentors is even more crucial than ever.

Food and Land

As our society becomes increasingly high-tech, we continue to become ever more disconnected from the natural world, down to what we eat. Food is something that comes in advertisement-laden packages. In some minds, Chicken McNuggets are barely meat at all. They are simply very tasty morsels of unknown origin with little connection to an actual chicken—or perhaps our society prefers to see it that way sometimes. Hamburgers come from Burger King and milk comes from a bottle. The cow is rarely thought of as being part of the transaction.

Food purchased with a dollar can often be valued as the same. It is much easier to dispose of or waste food connected to currency than food that must be first killed by the individual before consumption. Wildlife taken as food through the tradition of hunting becomes almost sacred. The American Indians honored wild game because it provided them the sustenance that was necessary to their survival. Fresh meat was greatly appreciated, and the creator was honored in a spiritual ceremony. Even today, many hunters believe that wasting game is not an option, living by the mantra, "If you kill it, you eat it or you don't hunt it."

Just as we are increasingly distant from our food sources, we are continually restricted to smaller and smaller blocks of land. Despite that, hunters still find places to hunt each and every season, whether on public or private land. There are more than 2 million acres of publicly accessible hunting property in the Game Lands Program in North Carolina, and not all are being utilized fully. In short, hunting opportunities abound here. All one needs to do is a little preseason scouting and mapping to see what is there.

Time to Take Action

The legitimate excuses are real; research continues to tell us that. Old age, lack of time and lack of access are hunting impediments that will not change or go away. They are simply facts in the continually changing world in which we live. However, a simple fact also remains that there are enough passionate hunters today who have the ability to make a

Visit www.ncwildlife.org to purchase hunting licenses, schedule a hunter education course, view maps of game lands, read hunting regulations, find species information and much more.

significant difference by sharing the heritage they love. In fact, if every hunter in North Carolina were to take at least one person hunting who has not hunted before, they would contribute greatly to the hunting culture.

I have always been a hunter, and I've come to learn that I can be a mentor too. I owe it to the culture of hunting for all that it has given me over the many years. More importantly, I also owe it to Uncle Bill. Despite all the demands of life, he took the time to share his passion of hunting with my brother and me.

Reflect back on the person who introduced you to hunting. If hunting really matters to you, become a hunting mentor and share the tradition in the coming seasons. There is no better way to say thanks. ◆

Walter "Deet" James is the Hunting Heritage Biologist for the N.C. Wildlife Resources Commission's Hunting Heritage Program.

IF HUNTING CEASED TO EXIST IN THE U.S.

Additional 50,000 injuries annually from wildlife-auto collisions

$1.45 billion in health care and disease control costs for rabies alone

Up to $9.3 billion in taxpayer money to control deer

Up to $265 million in taxpayer money to control furbearers ($32 million for beavers alone)

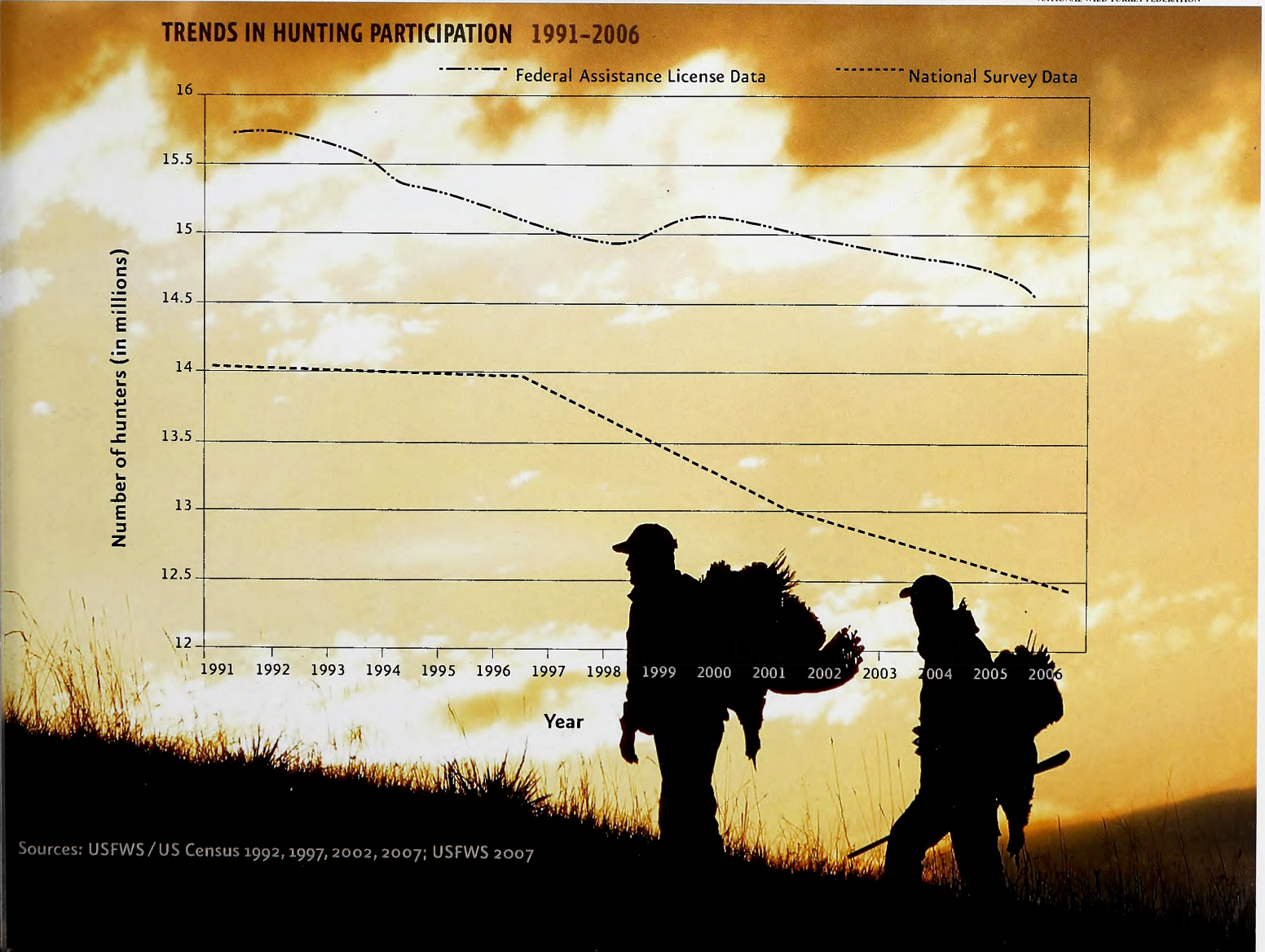
Over $3 billion annually in damages to crops and livestock

$972 million annually in damages to homes

Source: "Potential Costs of Losing Hunting and Trapping as Wildlife Management Methods," International Association of Fish and Wildlife Agencies, 2005.

F. EUGENE HESTER

NATIONAL WILD TURKEY FEDERATION



SUMMERTIME, TERROR

They're neglected, sometimes even forgotten, but imitations of the land-based creatures of summer can be deadly for trout and bass.

Written by Marty Shaffner

RICHARD BERNABE

AND THE FISHING IS

When the dog days of summer are upon us and hot and humid weather conditions are the daily forecast, many fly-fishermen pack it up for the year. What a shame, for summertime means terrestrial time and some of the best top-water fly-fishing of the year.

The mayfly and caddis fly hatches of spring are replaced by terrestrial insects. Hatches, except for midges, are infrequent this time of year, and that makes the fish take notice of the increasing number of terrestrial creatures that fall into the water. Trout, smallmouth bass, panfish and even largemouth bass — especially largemouths in farm ponds — feed heavily upon them.

Although they don't live or hatch in the water, these insects do find their way into it, either by falling from overhanging vegetation or by landing as they fly over the surface. Terrestriuls are the most overlooked flies in an angler's fly box, if his box even contains any of those patterns.

TRIAL

KNOW YOUR BUGS

As with any "hatch," you first must know something about the bugs in order to imitate them. Summer brings a multitude of terrestrial insects and other creatures. Beetles of various kinds, ants, grasshoppers, crickets and inchworms all find their way into our waterways. Although not true terrestrials because their nymphs live in the water, adult damselflies and dragonflies must be considered as such, especially for bass and panfish.

Beetles are probably the closest thing to a hatch you'll encounter, except for a flying ant hatch. Beetles come in many forms, but Japanese beetles and junebugs are two of the most abundant species an angler will see. They appear in great numbers at times, so fish key on these bugs when they begin to emerge. These two beetles are similar in color and shape but differ in size. Japanese beetles are approximately the size of a 14 to 16 dry-fly hook, with junebugs being much larger. In addition, many different species of black hard-shell beetles live in the trees and bushes that line the banks of North Carolina waters.

Ants and flying ants also are important, especially for trout. Although I have caught smallmouth bass with ants in their mouths, I just can't quite bring myself to fish a small ant pattern for bass. And I recall that once, as a teenager, I caught a decent-sized largemouth on an ant pattern while fishing for bream. I don't know who was more surprised, the bass or me. Ants come in sizes from very small to large (sizes too small to imitate to at least a size 14 or 12 hook). And ants have a variety of colors—black, red or cinnamon—with black ants being the most common. Flying ants can emerge in great blizzard-like hatches blanketing streams, and fish will gorge on them. I've encountered this event only on a handful of occasions, but if you do happen onto a hatch, you won't forget it.

Grasshoppers and crickets are plentiful at times, with grasshoppers more prevalent later in the summer and into early fall. Grasshoppers are more important to both largemouth and smallmouth bass fishermen because they are more common in the grassy fields and pastures that border many of our ponds and some of our rivers. Even though most of our trout streams are in wooded areas, don't overlook hopper patterns cast tight to the bank if you know of a stream that runs through a grassy area. Grasshoppers occur in many sizes, but most are at least the size of a 10 3x-long hook, and some are much bigger, up to size 4 3x-long. They also vary in color, from green to yellow to light olive to tan.

Don't forget crickets, especially for trout. Crickets prefer wooded, damp and dark places like the locations where most trout streams are found. Crickets are either black or tan, but the black ones are most common in the wooded areas along trout streams. I have had success fishing for trout with a black cricket pattern cast near banks. Almost every fly angler I know has a grasshopper pattern or two in his box, though not many have

RICHARD BERNABE

cricket patterns—but they should. I've had more success on trout streams with cricket imitations than with grasshoppers.

Inchworms are often overlooked, but I have found them to be very productive patterns for trout. Inchworms hang from their webs like string from branches over wooded streams throughout North Carolina and regularly fall into the water. They vary in color from mint green to almost chartreuse and average in size from three-quarters of an inch to well over 1 inch. I have had good days throwing inchworm patterns on many trout streams in the state, but the trout in the Great Smoky Mountains National Park seem to really have a taste for them.

Damselflies can be especially deadly in the summer, as bass will leap to take them as they hover or eat them when they die and fall into the water. Damsels occur in an array of colors, such as light blue, dark blue, red and a light cinnamon red. These seem to be the most common, but at times you will see others.

FLY PHOTOGRAPHS BY F. EUGENE HESTER

Terrestrials imitate a variety of insects and other creatures. This brown trout (left) fell to a grasshopper pattern, a fly that has proven its value for both trout and bass. Among other terrestrials an angler might carry in his fly box are (clockwise from top left): a beetle made of balsa wood, a foam grasshopper, an inchworm, a Chernobyl ant, a foam beetle and a carpenter ant.

JIM DEAN

THE FLIES AND HOW TO FISH THEM

Despite the number and variety of terrestrials, a handful of different patterns will catch a lot of fish. If you're a trout fisherman, you need a small beetle pattern, and it's not a bad idea to have a large beetle pattern as well. I tie a size 14 or 16 beetle pattern with black craft foam tied in at the rear of the hook. Then I wind four to six strands of peacock herl, which are divided and pulled back for the legs and trimmed to one-third the length of the body. I pull the foam forward, tie it off and trim it fairly close, but with a little foam sticking past the eye. Then I either glue a piece of yellow foam on top of the back of the beetle or tie it in at the head.

I tie the same pattern with a size 10 or 12 hook for my larger beetle pattern. I've caught lots of fish on these patterns, with the smaller one getting the call most of the time. Beetle patterns should be cast near the bank or under overhanging limbs and vegetation on larger streams, or anywhere on a small stream that has a tree canopy. Don't worry if your beetle patterns hit the water with a hard "plop." That sound is like a dinner bell to fish. I intentionally make my bugs hit the water hard by using a tuck cast, which makes the fly smack the water before the line comes down softly. The cast is performed by snapping your wrist at the last moment of the cast and pulling back and up on the butt of the rod while forcing the tip in a downward motion. It takes a little practice but works well for all terrestrials and poppers for bass.

Trout fishermen will also need a few ant patterns. If I could have only one ant pattern, I'd have a size 18 black fur ant, but what fly fisherman can stop at just one pattern? I also carry a black dry-fly version in a larger size —12 or 14. A hard-bodied size 18 black ant also will serve you well and is an overlooked and underfished pattern, especially on waters that are fished hard. I also carry some size 18 winged versions in black and cinnamon. Fish your ant patterns in the same way and same places as the beetles.

If you're not having any luck with flies that are an attempt to match the hatch, try a beetle or ant. You might be surprised how often this will work. I was fishing the South Holston River tailwater in east Tennessee once when I located a fish rising to sulfur mayflies near the bank under an overhanging tree. I floated several different sulfur patterns over him, both dries and emergers, without success. As the fish continued to feed, I looked through my fly box for another pattern to try. I noticed the tree limb hanging out over the fish and thought maybe a beetle would work. I tied on a size 14 beetle pattern, and on the first cast the beetle disappeared in an unimpressive dimple on the water. When I raised the rod tip to set the hook, the water erupted as a huge brown trout measuring 24 inches wallowed at the end of my line.

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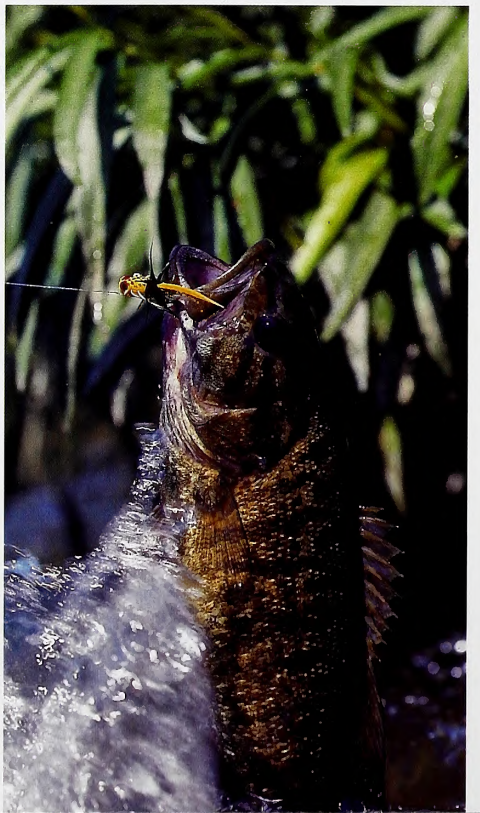

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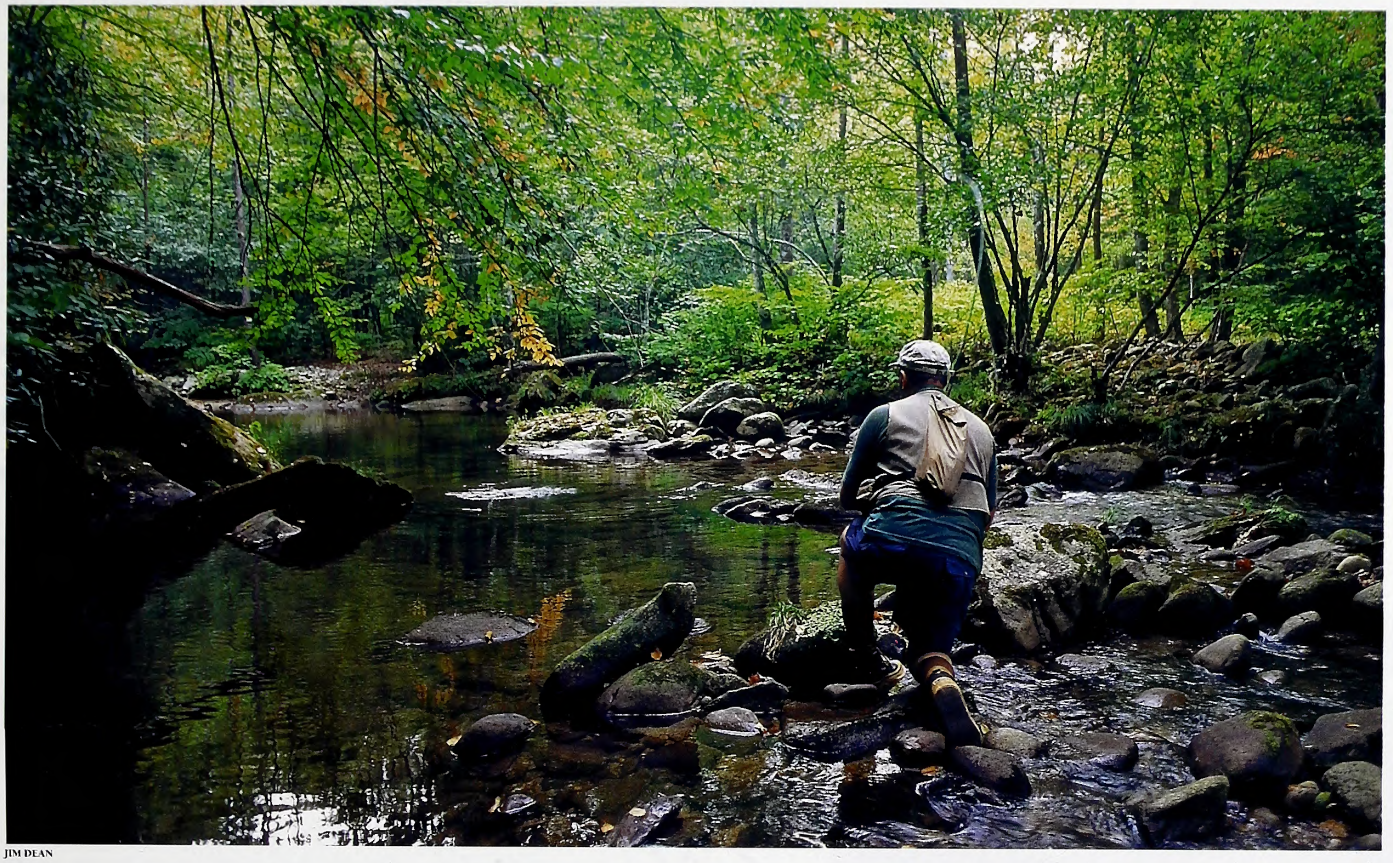
Poppers, which imitate no particular insect, are deadly lures for a number of species of fish, including panfish (top) and smallmouth bass.

I wish I could say this story has a happy ending, but it doesn't. The big brown was too much to handle on light tippet, and he broke me off on an underwater obstruction. I had been too lazy to upsize my tippet when I tied the beetle on, thinking I wouldn't have success anyway. I've not made that mistake again. Because terrestrials are a big meal compared to most aquatic insects, trout usually take them more aggressively than other flies, allowing for the use of heavier tippets.

Anglers will also need a couple of grasshopper and cricket patterns in their arsenal. Try a Joe's Hopper and a Club Sandwich in size 8 or 10 in tan or yellow and a cricket pattern such as a Parachute Cricket (black cricket patterns are very hard to see on the water in shady areas) or small Chernobyl Ant tied on a size 10 or 12 2x-long hook. Cast the hopper patterns tight to grassy banks and the cricket patterns near any bank. A Chernobyl Ant is a great generic terrestrial pattern for trout and bass, especially in black, but in yellow it makes a pretty good grasshopper and attractor pattern. It is almost unsinkable when used as dry fly in a dry fly/dropper combination. Also get a few inchworm patterns such as a Green Weenie or a green San Juan Worm; either will work well cast under overhanging limbs. These patterns should serve you well for trout almost anywhere.

Bass have a different attitude than trout. I have had more success over the years using generic buggy patterns for bass than the exact imitations preferred for trout. For bass—smallmouth and largemouth—the popper is king. Lots of rubber legs in black or a combination of black and another color is best, although yellow has caught a lot of fish at times. For smallmouth bass or largemouth in rivers, poppers should be cast to banks and under overhanging trees with the tuck cast, making the popper plop hard on the water. Poppers can be cast to slower water and midriver eddies to imitate June bugs, damselflies or dragonflies that have fallen into the water. Poppers also work well for largemouth bass in ponds.

I carry some Chernobyl Ants, Club Sandwiches, Steeve's UFO patterns and generic foam terrestrial patterns in sizes 10 to 4 in black, yellow and tan. These are fished in the



JIM DEAN

Most people already have the gear needed, except for a handful of new terrestrial patterns, to go hit the stream or pond. So get up out of that recliner and grab your fly rod for some of the best top-water action of the year.

same places as the poppers but seem to work better in lower, clearer water. The only exceptions to the generic patterns I use are more realistic damselfly patterns such as Hickey's Condor or Stalcup's Adult Damsel for smallmouth bass and a few Carolina blue poppers.

Fish these patterns in more open water where you see bass jumping to take hovering damselflies. The more realistic patterns can be very productive in shallow, clear water. I recall one float trip a couple of years ago when I spotted a really nice smallmouth bass suspended in some slow water on the New River. The river was low and clear as glass. We floated two different poppers over the fish, only to be rejected both times. I changed my client's fly to a blue foam version of a spent damselfly. The third time was the charm. The big fish swam up to the damselfly pattern, followed it downstream a few feet and sipped it in with all the delicacy of a brown trout on a highly pressured trout stream. After a few minutes of hard battling, we were admiring a fat 19¼-inch New River bronzeback.

GO FISH

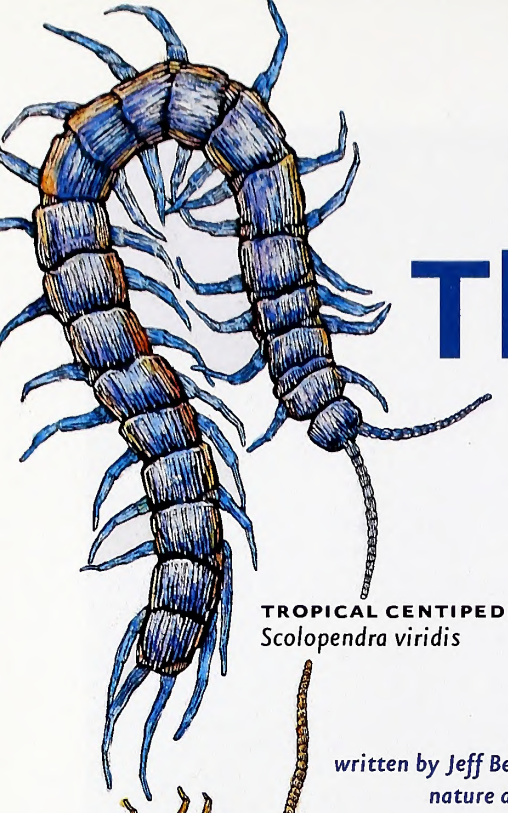
Terrestrial fishing is both productive and fun. Fish are very opportunistic when taking terrestrial patterns and usually hit hard and fast, making the angling exciting. Any fly rod you would normally use on the stream you are fishing will work fine. I prefer a 7½-foot 4-weight rod for the smallest of North Carolina's trout streams and an 8½- or 9-foot 4- or 5-weight fly rod for larger streams and rivers. Also, you can usually get by with one size heavier tippet when fishing terrestrials, especially beetles, hoppers and crickets. Fish get conditioned to racing over and grabbing a terrestrial before another fish gets a chance to eat it. I usually fish 4x on small streams and 5x on more heavily pressured waters.

For bass a 9-foot rod in 6, 7 or 8 weight will work best. The larger-weight rod will handle not only the bigger fish but also the bigger flies you usually will be casting in these situations. The heavier-weight line is especially handy when fishing large poppers. Most people already have all the gear needed, except for a handful of new terrestrial patterns, to go hit the stream or pond. So get up out of that recliner and grab your fly rod for some of the best top-water action of the year. Once you experience terrestrial fishing, you might find yourself not dreading the dog days of summer so much. ◆

Marty Shaffner is a western North Carolina fishing guide who works with Tri-State Angler Guide Service. This is his first story for WINC.

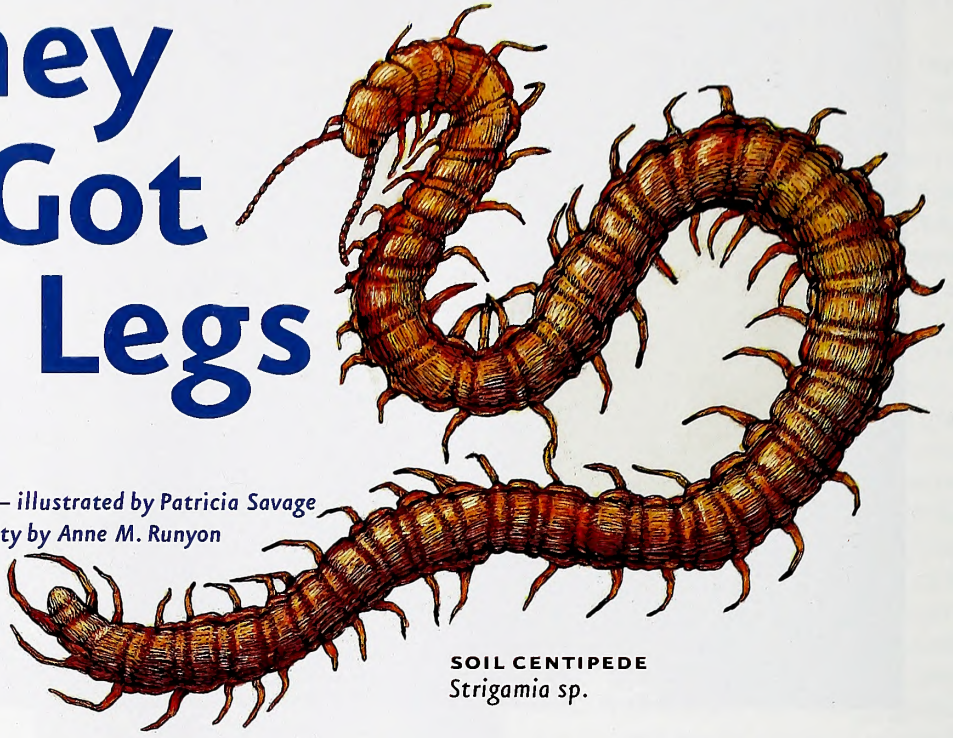
What are they? How many legs do they really have? Can they hurt you? How do you tell them apart? One thing's certain about centipedes and millipedes:

They Got Legs



TROPICAL CENTIPEDE
Scolopendra viridis

STONE CENTIPEDE
Lithobius sp.



SOIL CENTIPEDE
Strigamia sp.

written by Jeff Beane – illustrated by Patricia Savage
nature activity by Anne M. Runyon

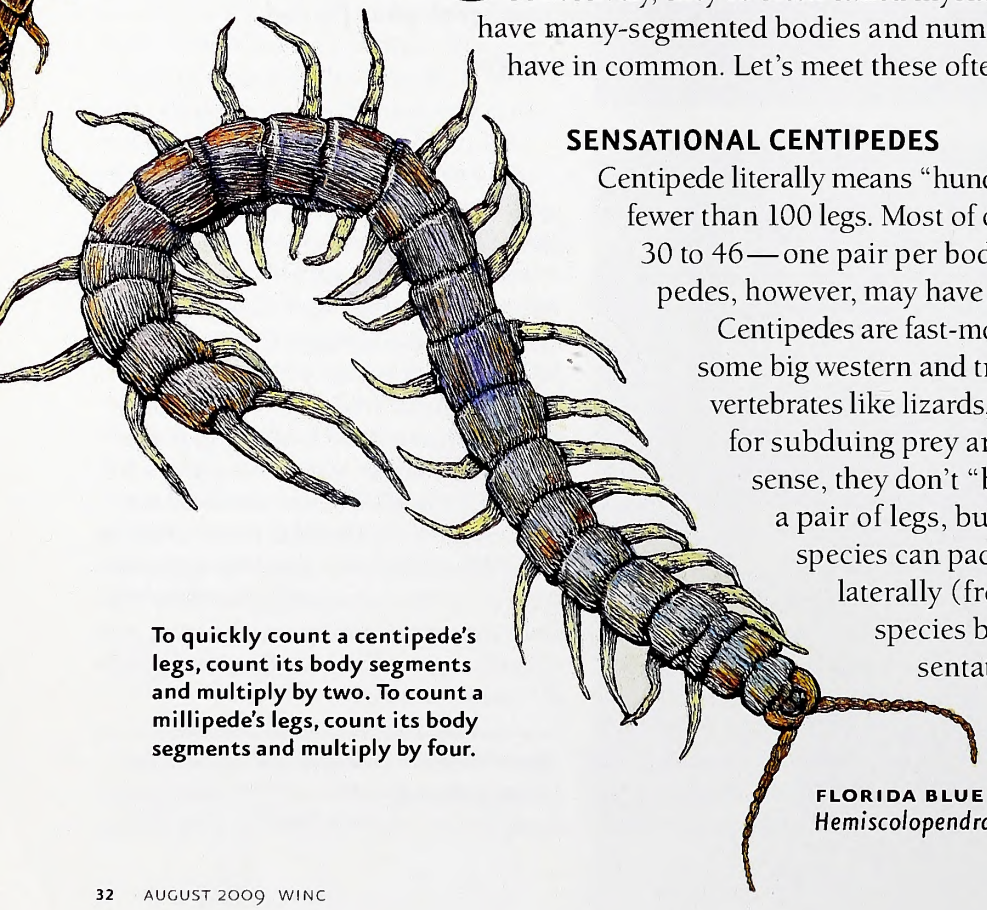
Centipedes and millipedes represent two very different arthropod groups. Collectively, they're often called myriapods (meaning "many feet"). Both have many-segmented bodies and numerous legs, but that's about all they have in common. Let's meet these often misunderstood animals.

SENSATIONAL CENTIPEDES

Centipede literally means "hundred foot," but most centipedes have fewer than 100 legs. Most of our more familiar species have from 30 to 46—one pair per body segment. Some of the soil centipedes, however, may have more than 100 legs.

Centipedes are fast-moving predators. Most eat insects, but some big western and tropical species may overpower small vertebrates like lizards, snakes and bats. All produce venom for subduing prey and for self-defense. In the strictest sense, they don't "bite," since their "fangs" are actually a pair of legs, but whatever you call it, the larger species can pack a wallop. Centipedes' legs attach laterally (from the sides). Most of the world's species belong to four orders, all with representatives in North Carolina.

To quickly count a centipede's legs, count its body segments and multiply by two. To count a millipede's legs, count its body segments and multiply by four.



FLORIDA BLUE CENTIPEDE
Hemiscolopendra marginata

FAMILIAR CENTIPEDES

The Lithobiomorpha ("stone centipedes"), often found beneath rocks or logs, are mostly small, dark brown or reddish brown centipedes with relatively short bodies and 15 pairs of legs.

The Geophilomorpha ("soil centipedes") are very long and slender, with the most legs of any centipedes. They live in soil or surface litter and are usually brown, yellow or red.

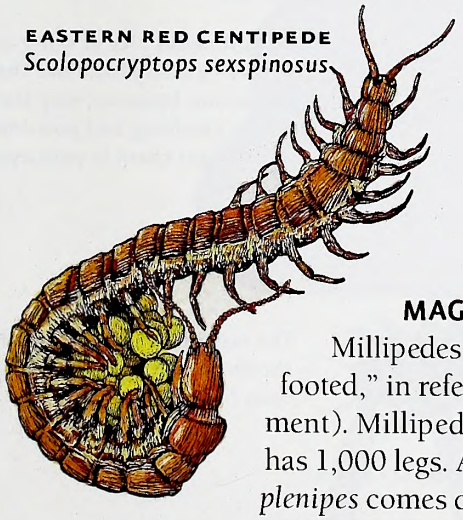
The Scolopendromorpha ("tropical centipedes") are the most familiar group—the ones most people envision when they think of centipedes. Eight species occur in North Carolina, and they're fairly easy to learn. *Scolopendra viridis*, our largest species (reaching four inches or so) is blue-green, inhabits Coastal Plain longleaf pine forests, and can deliver a painful sting. *Scolopocryptops sexspinosus* is a fairly large, widespread, bright orange species commonly found under logs.

Our sole representative of the Scutigeromorpha ("house centipedes") is an invader—the common house centipede, *Scutigera coleoptrata*. Native to the Mediterranean, it has been accidentally introduced all over the world and is common in and around buildings. It has 15 pairs of very long legs, which it can autotomize (voluntarily shed) if stressed. Though most people don't like these fast-running centipedes in their homes, they eat cockroaches and other household pests. Like all centipedes, they can "bite" if handled, but the bite is usually less painful than a bee sting.

LARGE AMERICAN MILLIPEDE
Narceus americanus

It's unwise to handle centipedes; most will "bite" in self-defense, though the smaller ones can't penetrate our skin.

NO COMMON NAME
Brachycybe lecontei



EASTERN RED CENTIPEDE
Scolopocryptops sexspinosus

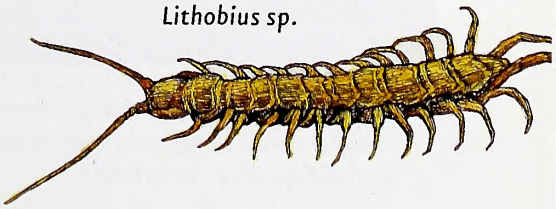
MAGNIFICENT MILLIPEDES

Millipedes form the class Diplopoda (meaning "double-footed," in reference to their two pairs of legs per body segment). Millipede means "thousand foot," but no millipede has 1,000 legs. A rare California species called *Illacme plenipes* comes close, averaging over 600.

Millipedes are inoffensive, usually slow-moving creatures. Their primary defense is hiding. If that fails, they coil into a spiral and secrete various toxic or bad-tasting chemicals. The flatback millipedes (order Polydesmida) produce hydrogen cyanide, which makes some of them smell like cherries or almonds. Millipedes are detritivores, which means they eat decomposing organic material like dead leaves and rotten wood. Unlike those of centipedes, their legs attach ventrally (from underneath).

A centipede was happy quite,
Until a frog in fun said,
"Pray, which leg comes after which?"
This raised her mind to such a pitch,
She lay distracted in the ditch,
Considering how to run.

– Anonymous



STONE CENTIPEDE
Lithobius sp.

LARGE AMERICAN MILLIPEDE
Narceus americanus

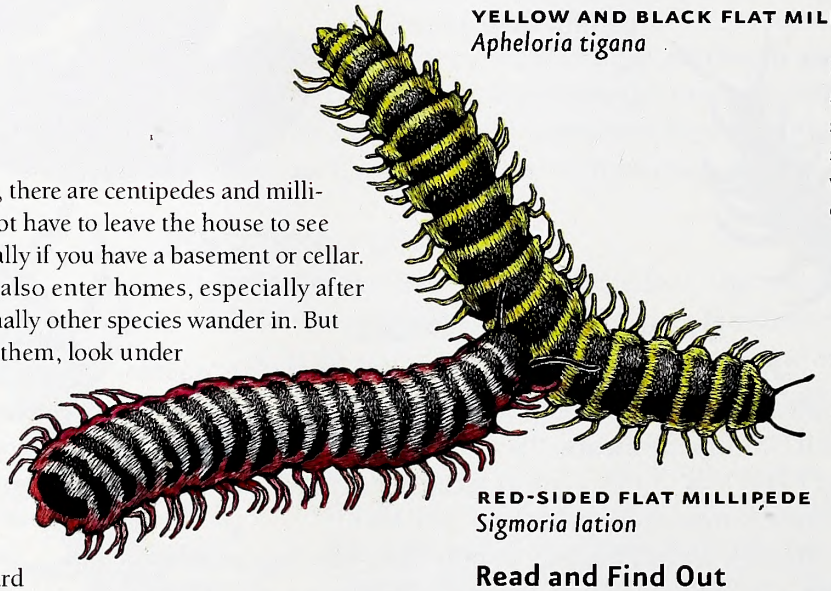
A FEW FAMILIAR MILLIPEDES

North Carolina has well over 200 millipede species, belonging to several different orders and families. Like centipedes, few have common names. Our largest species (reaching four inches plus) is *Narceus americanus*, a cylindrical, reddish brown animal that's common statewide.

Our state's (and the world's) most abundant millipede is *Oxidus gracilis*, often called greenhouse or hothouse millipede. This small, blackish-brown, southeast Asia native has been introduced worldwide in greenhouse plants. It frequently enters dwellings, where it eventually curls up and dies in a corner. However annoying, these millipedes are harmless.

Several rather large, flat, blackish millipedes with bright yellow, pink, or red markings are common in wooded areas. These belong to the family Xystodesmidae, and *Apheloria* and *Sigmoria* are common genera. Their cyanide secretions give them a sometimes pleasant smell.

To tell male millipedes from females, look underneath. On the seventh segment behind the head, males have one leg pair modified into hook-like structures called "gonopodia" (if all the legs look the same, your millipede's a female). These structures are easiest to see on large, flat millipedes and can be difficult to see on small, cylindrical ones—especially considering their habit of rolling up.



YELLOW AND BLACK FLAT MILLIPEDE
Apheloria tigana

RED-SIDED FLAT MILLIPEDE
Sigmoria lation

No millipedes bite or sting—all may be safely handled. Their secretions, however, may stain skin or clothing, and you don't want to get them in your eyes or mouth.

The centipedes and millipedes shown on these pages are larger than life-sized.

Get Outside

No matter where you live, there are centipedes and millipedes nearby. You may not have to leave the house to see house centipedes, especially if you have a basement or cellar. Greenhouse millipedes also enter homes, especially after heavy rains, and occasionally other species wander in. But if you really want to find them, look under rocks, logs, and other sheltering objects, especially in damp places. Spring and fall are the best times, or after rains. During summer droughts and hard freezes, most burrow deep and aren't easily found. How many different kinds can you find in your neighborhood? Unfortunately, good centipede and millipede identification references are few, but the BugGuide. Net website can be helpful, or you can try taking specimens (or sending photographs) to your local museum or agricultural extension office. While you look, take time to smell the xystodesmids! And remember to handle centipedes cautiously (or not at all), and to carefully replace rocks and logs without crushing the animals beneath them. The Arthropod Zoo at the North Carolina State Museum of Natural Sciences includes centipedes and millipedes in its exhibits.

Read and Find Out

- "Centipedes and Millipedes with Emphasis on North American Fauna" by Rowland M. Shelley, The Kansas School Naturalist, 1999.

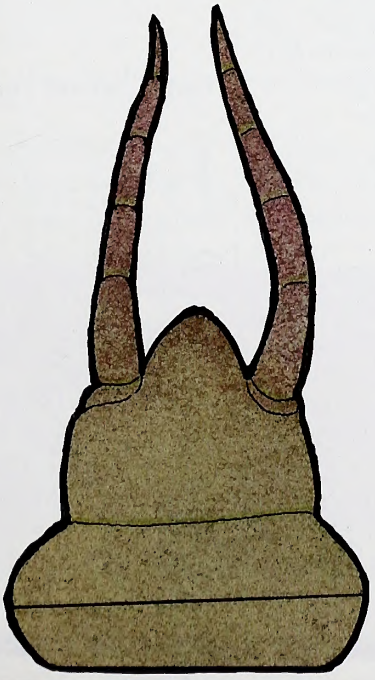
In *Wildlife in North Carolina:*

- "The World's Leggiest Creatures" by Mark Joyner, July 2008.
- "Dr. Millipede" by David S. Lee, May 1996.
- "Do They Really Have 1,000 Legs?" by Harry Ellis, June 1994.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Create a Dancing Centipede Sculpture

1) Cut out rectangle.
2) Fold rectangle into fourths, accordion style, with black (head end) on top.
3) Cut away black areas around legs. Be careful to cut through all four layers.
4) Unfold body and cut off the 4 green-tipped legs.
5) Then accordion fold body down on solid lines and up on dashed lines. This allows centipede to wiggle and dance.
6) Cut out head and tail.
7) Fold both head and tail down on solid lines.
8) Glue head to head end. Glue tail to tail end.



This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Commission Gets $1.5 Million in Grants for Nongame

The N.C. Wildlife Resources Commission has received $1.5 million to help fund projects and programs that protect and manage nongame wildlife in the greatest need of conservation, as identified in the N.C. Wildlife Action Plan.

The money is awarded by Congress through the U.S. Fish and Wildlife Service as part of the State Wildlife Grant Program. Since 2001, when North Carolina received its first State Wildlife Grant, the commission and conservation partners have spent more than $11.5 million on programs and projects benefiting nongame wildlife and their habitats. A few of these programs and projects include:

•Green Growth Toolbox, a guide to help towns, cities and counties grow in a greener, more wildlife-friendly way. The guide contains information on the state's most important habitats, as well as community-planning methods and site-design techniques that can help conserve North Carolina's priority species.

•A captive-culture propagation program that aims to restore mussel populations in rivers throughout the state. State Wildlife Grant funding helped the commission build a new Conservation Aquaculture Center at the Marion Fish Hatchery where all aspects of mussel culture—from the infestation of fish hosts to "grow-out" of juvenile mussels—are conducted.

•Collaborative studies with universities and the N.C. Museum of Natural Sciences to determine the distribution, abundance and population limiting factors on N.C. Wildlife Action plan priority species, such as the painted bunting and Swainson's warbler, and grassland-dependent birds and mammals. State Wildlife Grant funding enables the commission and its conservation partners to gather critical information about these species and to manage them to sustain populations in the face of dramatic habitat changes.

MASLOWSKI PRODUCTIONS

"State Wildlife Grants are increasingly important to the commission and our conservation partners when we are all feeling the pain of the financial crisis," said Chris McGrath, Wildlife Diversity Program coordinator. "Through these funds, matched by volunteer efforts and the generosity of North Carolinians continuing to contribute to the Nongame and Endangered Wildlife Fund, we and our partners will continue to pursue proactive conservation to ensure a bright future for wildlife and for North Carolina."

The State Wildlife Grant Program provides annual funding to all 56 state and territorial fish and wildlife agencies with established State Wildlife Action Plans. The action plans collectively provide a nationwide blueprint of actions to conserve species with conservation needs and prevent them from becoming endangered. They were created in a collaborative effort that included biologists, conservationists, landowners, sportsmen and the general public. The action plans were reviewed by a national team that included the U.S. Fish and Wildlife Service and directors from state fish and wildlife agencies.

Secretary of the Interior Ken Salazar said that more than $61 million will be distributed to fish and wildlife agencies of the 50 states, commonwealths, the District of Columbia and territories.

"The State Wildlife Grant program exemplifies the Department of the Interior's strong support for conservation efforts by the states," said Salazar in a news release issued by the U.S. Fish and Wildlife Service on May 19. "Along with President Obama's commitment to the Land and Water Conservation Fund, the State Wildlife Grants will provide states critical funding to help conserve their highest priority wildlife, plants and habitat."

The State Wildlife Grants program provides grants to state and other eligible jurisdictions through a formula-based distribution calculated using the state's land area and population. Congress initiated this grant program in fiscal year 2002 and funded it from the Land and Water Conservation Fund. Since the program's inception, Congress has provided $502,246,708 for conservation work on state and private lands.

Get Connected with Wildlife

The N.C. Wildlife Resources Commission has developed an electronic newsletter to keep North Carolina hunters, anglers and other outdoor enthusiasts informed of agency-related news.

N.C. Wildlife Update, which is sent to e-mail subscribers on a periodic basis, contains important agency-related information such as upcoming hunting, fishing and trapping season dates, legislative updates, news releases, and hunter education workshops, fishing clinics and other events either hosted or sponsored by the Wildlife Resources Commission.

To receive N.C. Wildlife Update and to view past news briefs, visit www.ncwildlife.org.

Recreational, Commercial Finfish Landings Fall

North Carolina commercial seafood landings rose by 13 percent in 2008, bolstered by the best hard blue crab harvest since 2003. The increase ends a five-year decline for the state's seafood industry.

Of the 71.2 million pounds of seafood sold to dealers last year, nearly half, or 32.9 million pounds, were hard blue crabs, according to the N.C. Division of Marine Fisheries' Trip Ticket Program. Hard crabs also contributed $25 million to the $87 million total dockside value of seafood in 2008, a $4 million inerease from the 2007 total.

Commercial finfish landings, however, fell by 9 percent to 27.6 million pounds. This included a 59 percent drop in yellowfin tuna harvest, a 30 percent drop in swordfish harvest and a 17 percent drop in bluefish harvest. Conversely, there was a significant increase in tilefish landings, which were the highest on record at 404,295 pounds. Triggerfish landings also increased by 28 percent.

Likewise, the recreational fishing sector saw declines in finfish harvests in 2008.

The number of recreational finfish caught dropped about 18 percent to 12 million while the number of recreational fishing trips remained roughly the same, at 7 million, according to North Carolina Marine Recreational Fishery Statistics Survey estimates.

"There was a decline in for-hire and private boat trips, but an increase inshore and pier fishing," said Doug Mumford, the state Division of Marine Fisheries' recreational statistics program manager. "It appears the high fuel prices and other economic factors may have influenced fishermen to choose the piers, with blanket fishing licenses, over their boats."

Dolphinfish remained the top recreational species, with 3.6 million pounds (405,784 fish) caught, followed by groupers at 1.2 million pounds (99,468 fish), bluefish at 1 million pounds (1.3 million fish), striped bass at 921,051 pounds (44,006 fish) and spotted seatrout at 911,097 pounds (576,703 fish).

The 57 percent increase in the commercial blue crab harvest contributed to a 34 percent increase in overall shellfish landings, which also saw steady shrimp catches. The shrimp harvest declined by 1 percent, but the landings were still 64 percent higher than the previous five-year average.

"Although crab pot trips were down from last year, the winter crab trawl fishery was very good, contributing to the increased landings of hard blue crabs compared to 2007," said Alan Bianchi, the state Division of Marine Fisheries' Commercial Statistics program manager.

"In the shrimp fishery, the high fuel prices during the fall likely led to the decline in the number of shrimp and skimmer trawl trips in 2008," Bianchi said.

Oyster harvest increased by 5 percent, as well, from 83,446 bushels to 88,008 bushels.

A full report of landings statistics can be found in the division's Annual Fisheries Bulletin at www.ncdmf.net. For more information on commercial landings, contact Bianchi at (252)808-8092 or Alan.Bianchi@ncdenr.gov. For more information on recreational landings, contact Mumford at (252) 948-3876 or Doug.Mumford@ncdenr.gov.

JODY DUGGINS / NCWRC

West Montgomery, Park Ridge Earn Skills Titles

West Montgomery High School, a sophomore effort in youth hunter education skills competition, recently won the senior division at the North Carolina championships. The Park Ridge Christian School Sharpshooters of Albemarle won in the junior division.

Both team and individual championships were determined at the 31st annual Youth Hunter Education Skills Tournament, held by the N.C. Wildlife Resources Commission in April at Millstone 4-H Center near Ellerbe. Categories were orienteering, target shooting in archery, .22 rifle, shotgun and muzzleloader, along with testing in wildlife identification and hunting safety knowledge.

NCWRC

West Montgomery won the senior division title in its second year of competition.

"There were upwards of 3,000 people at this year's event," said Travis Casper, the state's assistant hunter education coordinator. "The level of competition was incredible, and the commitment of these students is encouraging."

The Youth Hunter Education Skills Tournament is open to teams that previously competed and qualified at a district level. There are senior (high school) and junior (middle school and elementary) levels, with overall team and overall individual awards based on aggregate scores in all events.

Levi Epps of West Montgomery won the senior division overall individual championship. Junior division individual champion was Robbie Potts of Fall Creek. Complete results may be found at www.ncwildlife.org.

This popular competitive event is a component of the state's free hunter education program, offered to all ages in all 100 counties. Hunter education is required for all first-time hunting license buyers in North Carolina. Courses cover hunter ethics and responsibility, conservation and wildlife management, survival and first aid, specialty hunting and tree stand safety. For more information, visit www.ncwildlife.org or call (919) 707-0031.

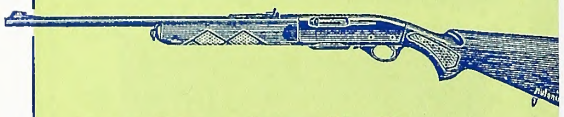
CALENDAR OF EVENTS

SATURDAY, AUGUST 1

Hit the water in the Dan River Boat Race in Madison. The 2.5-mile race is open to families and singles in canoes or kayaks
Visit www.danriverboatrace.org.

SATURDAY–SUNDAY, AUGUST 8–9

See the latest in guns, knives and other outdoor gear at the Dixie Gun & Knife Classic at the Jim Graham Building on the N.C. State Fairgrounds in Raleigh.
Visit www.dixiegunandknifeshow.com.



FRIDAY–SUNDAY, AUGUST 21–23

Check out the latest in boats at the Carolina Fall Boat Show & Sale at the N.C. State Fairgrounds in Raleigh.
Visit www.ncboatshows.com.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Dealing with Foxes

With reports of fox sightings in urban and suburban settings on the rise, the N.C. Wildlife Resources Commission is reminding residents that animals seen in the daytime are not necessarily dangerous or rabid.

However, people can and should take steps, such as yelling, banging pots and pans and setting off legal fireworks, to chase foxes from yards and neighborhoods. Be aggressive and repeat if the foxes don't leave.

"Scaring the foxes away once may not always work," said Joe Folta, a biologist with the commission. "The best time to scare them away is the first time they are seen. Many animals are cute and fun to watch, but when any animal enters your yard, try to think if you want this animal to keep coming back or return with relatives."

If the fox makes a den for pups, do not disturb them. Do not approach, touch or feed the fox or its pups.

To prevent foxes and other wild animals from entering your property and neighborhood:

KEN TAYLOR / NCWRC

- DON'T FEED WILD ANIMALS — THEY CAN LOSE THEIR FEAR OF PEOPLE.
- MAKE SURE YOU ARE NOT INDIRECTLY FEEDING WILDLIFE BY CLEANING UP PET FOOD, SECURING TRASH IN AN ANIMAL-PROOF CONTAINER, KEEPING BARBECUE GRILLS CLEAN AND REMOVING BIRD FEEDERS.
- ESTABLISH PROTECTIVE BARRIERS TO KEEP WILDLIFE FROM ENTERING BASEMENTS, CRAWL SPACES, ATTICS AND UNDERNEATH DECKS, WHERE THEY MIGHT BUILD NESTS OR DENS.
- SECURE PETS OR KEEP THEM INDOORS.
- DOGS CAN DISTURB DENS, PROMPTING AGGRESSIVE BEHAVIOR FROM THE FOXES.
- CLEAR OVERHANGING TREE LIMBS OR OTHER MEANS OF ACCESS THAT WILDLIFE USE TO ENTER A STRUCTURE.
- CLEAR FALLEN FRUIT FROM AROUND TREES.
- ENCOURAGE NEIGHBORS TO FOLLOW THESE SAME METHODS.

If the above solutions fail to remedy the problem, contact the commission at (919) 707-0010.

If the fox exhibits signs of rabies, such as aggression, lack of fear of humans, stumbling and foaming at the mouth, call your local animal control office.

Commission Adds Trapping Information

The N.C. Wildlife Resources Commission has added updated information about trapping to its Web site. The information includes trapping regulations, trapper educational opportunities, furbearer species and trapping Best Management Practices. It also includes guidance on wildlife depredation and damage control.

"We have seen an increased interest in trapping in North Carolina," said Colleen Olfenbuttel, a biologist with the commission. "The number of licensed trappers has almost doubled since 2002 and more members of the public are requesting information on how they can use trapping or licensed trappers to help them resolve wildlife conflicts.

"This update to our site will help educate licensed trappers and the public on trapping regulations, trapping technology, and the importance of trapping in helping us manage wildlife populations."

To find the trapping information, including the semiannual North Carolina Fur Management Newsletter, visit www.ncwildlife.org, and click on "Hunting/Trapping" on the left side of the page.

KEN TAYLOR / NCWRC

IN SEASON

This month, these seasons are open in North Carolina:

Crow:
Season runs from June 1, 2009, to Feb. 28, 2010.

Hatchery Supported Trout Waters:
Through Feb. 28, 2010.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2008–2009 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

How Are Beavers Adapted To A Semi-Aquatic Life?

written by Clyde Sorenson
illustrated by Jim Brown

BEAVERS ARE FAMOUS FOR THEIR BUILDING SKILLS, but they are just as remarkable in all the ways they have evolved to deal with their watery habitat. Beavers don't just shape their environment; like all other living things, they are shaped by it.

Beavers can close their ears when they dive, keeping water, and infectious agents, out. Their nostrils also have muscles that slam them shut when the animal submerges. A transparent nictitating membrane draws across the eye while under water, protecting it while preserving eyesight. And the loose pliable skin of the beaver's "cheeks" can close behind the animal's powerful incisor teeth, allowing it to chew on and carry wood while submerged.

All that trapped air should make the animal very buoyant. To counteract that extraneous flotation, the beaver's bones are much denser than those of a terrestrial animal. Beavers share this trait with whales and seals!

Beavers spend a tremendous amount of time in the water, year round, even in northern climes where their ponds freeze over. The beaver can do this without hypothermia thanks to its two-layered pelt. A very dense, fine under coat provides outstanding insulation by trapping a thick layer of air next to the animal's skin; the long, lustrous guard coat protects the under coat from wetting. The animal grooms oil into its guard coat with a special claw on it hind foot to complete the waterproofing.

Dreams Adrift

written by Jim Dean

I am down to fewer than four boats at present, but that is likely only a temporary condition. Two are ancient 12-foot aluminum pond boats, while the third is a center-console outboard that I bought used nine years ago. I also share a fiberglass flat-bottomed skiff with my brothers and son. I've never owned a truly high-dollar rig, or even one that's new, so I don't have a lot of money tied up. But I once calculated that I have owned or co-owned at least nine boats at one time or another over the years. Only someone who can envision life without boats would consider that excessive.

JIM DEAN

This nautical interest may be my oldest obsession. It even predates fishing (though not by much). Before I could read, I whittled crude wooden boats and set off across backyard goldfish ponds for uncharted continents, or waded the surf dragging a full-rigged ship on a string. All my favorite childhood books were seafaring adventures.

"While I admire any fair hull, those that carry sail are far and away the most fetching."

I spent so many summers in the 1950s building wooden ship models in a stuffy little outbuilding behind our home that I was a dizzy glue-sniffing addict long before anyone knew such a thing was possible (*I don't know, Mom, maybe it's the heat*). I still have a topsail schooner revenue cutter I finished when I was 12, along with other more ambitious models that I built as an adult. Even now, more than half a century later, I still piddle with models on occasion; and I have a closet full of plans, tools, reference books, kits and enough miniature lumber to scratch-build Lord Nelson's flagship, *Victory*, if not the entire Trafalgar fleet. But first, I have to finish a Baltimore clipper, skipjack oyster dredge, 1943 attack transport and the Revolutionary era brig *Fair American* gathering dust in my den. I probably would have run away to sea had I been born anytime before 1870 (and didn't get deathly seasick).

I was ship-obsessed even at the Virginia Military Institute, where all freshmen had to take a much-feared course in swimming. For the final exam, our hands and feet were tied together and we were tossed into the deep end of the pool where we had to survive for an hour in order to pass (live) or fail (drown). But our instructors had taught us what to do even if we'd never learned to swim—go into a jellyroll float, and lift your head for a breath periodically. It was actually relaxing if you didn't panic, and you could stay afloat for days until sleep or hypothermia overwhelmed you—longer if you had clothes and knew how to temporarily inflate them. That test instilled confidence, and I remember thinking, "This may be a useful skill when I circumnavigate the globe alone someday."

Of course, I haven't gotten around to that yet, and it is looking less likely. But shorter voyages aren't out of the question, and I've recently met the perfect companion. She is only 39 years old, and is still very much a spring chicken by my reckoning (meaning compared to me). She is also very tall and disturbingly shapely—curvaceous even. Though she may have some high-maintenance issues, she's otherwise quite reasonable. I have not yet asked for her hand or arranged with the bank for a dowry, but I am impressed that she has lots of experience—she will know what to do when I don't—and that could prove handy in a full gale somewhere in the Roaring Forties south of Cape Horn.

Serene is a gracefully aging 1970 fiberglass sloop owned and babied for decades by my oldest friends, Charlie and Midge Ogletree of Columbia, N.C. *Serene* has an interesting provenance, having been named for a 1920s wooden ketch owned by Midge's grandparents. Furthermore, she helped train their son, Charlie, who won a silver medal sailing Tornadoes (catamarans) at the 2004 Olympics in Athens. It is my respect for this illustrious pedigree, by the way, that prevents me from renaming her "Sail Ho," although I confess I sometimes think that aptly describes us both.

While I admire any fair hull, those that carry sail are far and away the most fetching. A sailboat, like a Harley-Davidson, symbolizes the lure of an unlimited horizon.

Perhaps I will motor down the Intracoastal Waterway to Florida, then sail east to the Bahamas, south to Belize, or beyond. I could live onboard, subsisting on fish, conch fritters and rum while fly-fishing for bonefish, permit and tarpon. Or I could anchor inside the hook at Cape Lookout, tie off a skiff, and fish for weeks at the time.

More likely, *Serene* and I will wind up in Chesapeake Bay where I will day-sail occasionally with my daughter and her family, returning at sunset to fish off the stern for croakers and crack open oysters, steamed crabs and beer.

Lord Nelson had a bigger ship and a more ambitious agenda (Rule Britannia), but suet pudding and hardtack can't beat a steamed crab.

SHAW KENNON

OUTDOOR MOMENT

Writing spider with katydid

IN THE SEPTEMBER ISSUE

RALPH HENSLEY

DOVE LOVE
A small amount of basic preparation can make your dove hunt a memorable, successful experience.

GRAND LAND
The 2008 Farm Bill offers landowners several different programs to help them improve wildlife habitat.

FEAR GEAR
The widespread usage of gadgets in hunting and fishing reflects a commensurate loss of outdoor skills.

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WILDLIFE IN NORTH CAROLINA

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A Northern bobwhite quail takes a dust bath. North Carolina landowners have used Farm Bill programs to restore quail and other wildlife. **PHOTOGRAPH BY MASLOWSKI WILDLIFE PRODUCTIONS.**

Volume 73 | Number 9

WILDLIFE IN NORTH CAROLINA

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Cover: For many hunters, September means mourning doves. Thousands of people will take to the field this month in pursuit of this common but elusive prey. PHOTOGRAPH BY RUSSELL GRAVES.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Mark Jones and I were discussing his story on the Farm Bill, "Conservation Canon," and I was asking him to put the law's dozens of programs in some sort of context for the average North Carolina citizen. "It's probably the greatest conservation program most people have never heard of," Mark explained, triggering an "ah-ha" moment for me.

RUSSELL GRAVES

As Mark writes in the story, co-written with colleague John Isenhour (page 4), the Farm Bill is a piece of legislation so deep and so broad that it encompasses everything from crop subsidies to food stamps. The law's name brings to mind either fields with endless furrows or fields that are endlessly fallow. In reality, these two mental images—farmers tending thousands of acres of government-subsidized corn, or farmers being paid not to grow other crops—reflect only a small part of what the Farm Bill does.

Mark's story highlights a number of programs within the Conservation Title of the legislation, programs that landowners and farmers may use to improve their land for wildlife habitat. Farm Bill programs are applicable to land in just about every county in the state. Whether you work your own farmland or rent it to others, there is probably a Farm Bill program (or two, or three) that could benefit wildlife.

The article is designed to contain much of the information a landowner would need to get started with this federally funded habitat improvement, but everyone should read the piece to truly appreciate how much thought and care went into crafting and implementing this significant law.

Admittedly, the Farm Bill can be confusing stuff to navigate solo, so there is a network of federal employees available to work with landowners to get them involved in the right programs for them. Once a landowner has worked up a plan and been approved for the proper programs, a technical assistance biologist from the Private Lands Program (which Mark Jones supervises) of the N.C. Wildlife Resources Commission steps in to closely guide their habitat improvement activities funded by the Farm Bill.

Participants have reported a veritable explosion of wildlife on their farms—from that first "bob-WHITE" call of a quail to the appearance of dozens of rabbits to the regular presence of raptors of all kinds. A lot of folks might not be familiar with it, but the Farm Bill is making a difference in wildlife populations all over North Carolina.

Greg Jenkins

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WILDLIFE IN NORTH CAROLINA

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Father-Daughter Lines

The note below is to my daughter who's away at camp for two weeks, the original attached to the cover of your July magazine and on her unmade bed. She knows I leave it for her each month.

I became a life subscriber—and gifted a couple to an uncle and my father's best hunting buddy—several years before we moved West because I remembered it from my childhood as more beautiful than even *Sports Illustrated*. Kasey, 10, loves it now for its nature and the kids' activities. She's got a bunch of the origami-like creations cut out, folded and on her bookshelves.

Kasey,
I hope you enjoy this issue as much as I did. Some of the anecdotes in the article about the effects of hurricanes on wildlife ("Creatures in the Storm") were priceless. The article about grass ("Rethinking Lawns from the Ground Up") makes me prefer natural areas to manicured lawns. The critters in the beautiful orange butterfly weed ("Visual Delights and Chemical Warfare") were incredible. Remember the Hartfords, who lived across the street in Hillsborough with their frog pond? I wanted to send them the article on treefrogs ("Frogs in Trees"), but I didn't want to keep the issue from you, especially after I read the article titled "The Gift of Home Waters."

It's a beautifully written story about a man's love of fishing quiet little North Carolina streams. It reminded me of everything I ever liked about fishing, which is frankly, not that much. The story was special to me for two more reasons. First, it involved a father and daughter. Second, it was written by Jim Wilson, whom I worked with when we were sportswriters at the Durham Morning Herald *many, many years ago. I knew him as nice and reflective, so reading his latest story, so personal and recent, made me feel very good that he works for this timeless magazine. I hope you will take time to read it. I think you will enjoy it, too.*

Love, Dad

Tony Britt
Longmont, Colo.

Pat on the Back

Just a short note to tell you how much I enjoy each issue. Being an avid angler, I especially enjoyed the Back Porch article on low vulnerability and high vulnerability largemouth bass ("Largemouths Inherit Tendency to be Caught") in the July issue.

I have a few dear friends that I send annual subscriptions as Christmas gifts and they all rave about the quality of content.

Lastly, do not, under any circumstances, allow Jim Dean to stop contributing on a monthly basis.

Ken Peterson
Charlotte

Ill About Drilling

I always enjoy reading your magazine and look forward to its arrival each month. I now live in Virginia, but I was born and raised in North Carolina. My interest in my home state is still very high.

"Plumbing the Depths" in the June 2009 issue really captured my interest. After reading the article I was quaking in my shoes! John Manuel spent most of the article exclaiming about the beauty and wonders of the natural creatures and plants of our coastal marshes and ocean. He also explained how important these resources are not only to the people of North Carolina, but the entire world, which comes to enjoy our treasurers. Mr. Manuel reports that Steve Ross' team discovered that our upper continental slope was one of the most productive deep-sea bottoms along the East Coast. Our marshes are a nursery for untold numbers of aquatic creatures, plus they are a buffer for storm surges.

How, then, can the state of North Carolina and all the other eastern seaboard states even consider the possibility of drilling offshore? The oil and gas people cannot guarantee that a spill won't happen. Even if a spill does not happen, what about the impact of the activity and pollution?

The article talks about the "mud" used to control subsurface pressures and lubricate the drill bits. The cuttings brought up from the hole will be dumped over the side of the drilling rig. These cuttings will contain some of the "mud" used to drill. Also, process water containing oil and grease will be dumped over the side.

What impact will this have on life below? Bottom dwelling species could be smothered, the article states. Pile enough of anything on the bottom life and it will be smothered! How far will ocean currents carry these pollutants? How long will it be before all of the earth's seas and oceans will be ruined?

Each time we destroy a piece of our environment we destroy a piece of ourselves. If we think we can harm and destroy lots of our natural wonders and not be harmed ourselves, then we are not living with truth. We are connected with nature and nature is connected with us. There is no way to get around this fact.

Please fight any plan to drill off our coast, and I sincerely hope that all the other East Coast states will do the same. These wonders of nature are tremendous gifts to enrich our lives, not to use up and destroy. Future generations will want to see and enjoy them too—and not just in a book.

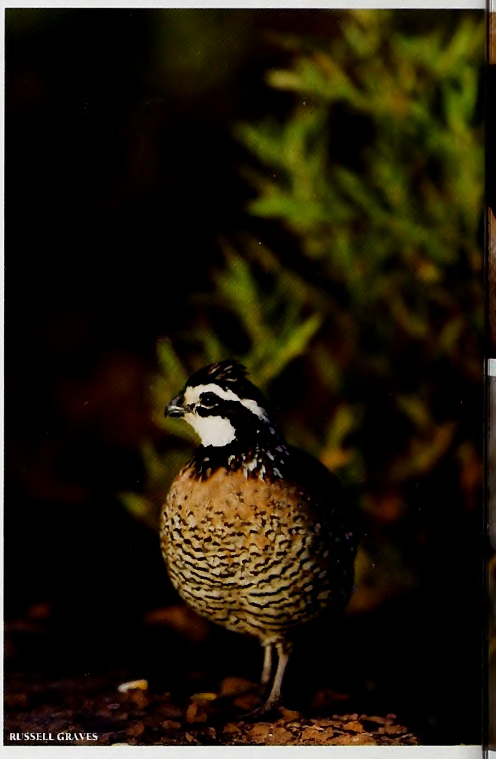
Peggy Harris
Fork Union, Va.

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

MELISSA MEGAW / NCWRC

Sometimes described as the greatest conservation law that people have never heard of, the Farm Bill offers dozens of programs for landowners and farm managers who want to improve wildlife habitat on their property.



RUSSELL GRAVES

Conservation Canon

It's dawn on a beautiful spring morning, and John Bishop has just heard the distinctive "bob-WHITE" call of a male Northern bobwhite quail on his Anson County property. As Bishop stands looking over the field from which the quail is calling—a large field recently converted from cropland to a mix of native grass and forbs—he hears a second male bobwhite calling in a pine plantation treated with prescribed fire.

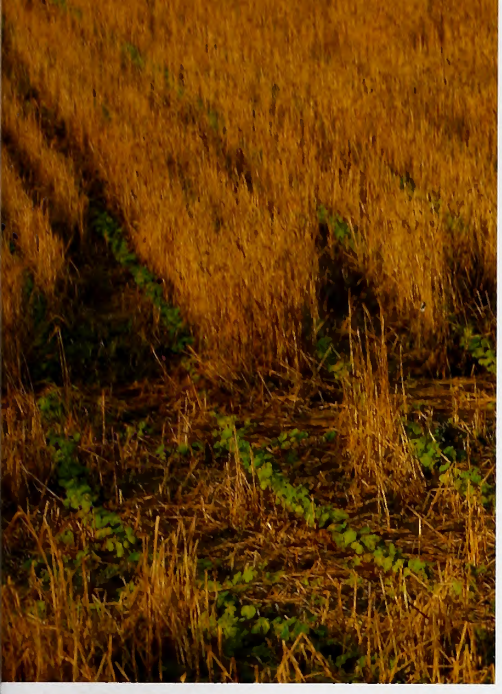
The fields and woodlands attracting the bobwhites represent some of the best early successional habitat (areas of grasses, forbs, beneficial weeds and shrubs required or preferred by many wildlife species) in the Piedmont. Bishop's property is an island of hope in a sea of detrimental landscape practices that have brought populations of quail, rabbits and many songbirds to historically low levels throughout most of the Southeast over the last 50 years.

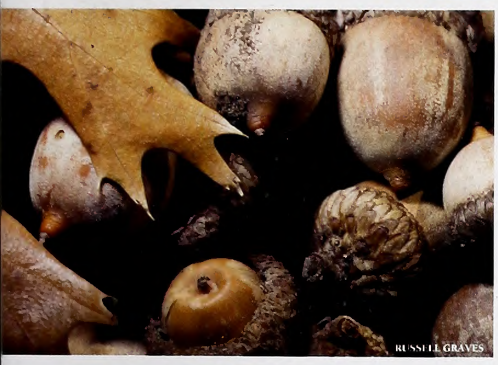
Bishop, an avid hunter and conservationist, saw the decline of the rural lifestyle and associated wildlife habitat in his native Piedmont and decided to do something about it. His goal, "to manage this farm in a way that maximizes quality water, land and wildlife; not only for my family but for all succeeding generations," spurred him to address this decline on his property.

The current management of Bishop's farm is an ongoing process carried out with financial assistance from U.S. Department of Agriculture (USDA) Farm Bill funds and with technical assistance and advice from N.C. Wildlife Resources Commission (NCWRC) private lands biologists. These cooperative efforts have allowed Bishop to enjoy high-quality rabbit hunting and noticeable increases in quail and songbirds.

The transformation of Bishop's farm began with 280 acres of precommercial thinning in young pine plantations and mixed forest stands scattered across his property. Bishop soon recruited assistance from Wildlife Commission biologists and USDA staff to incorporate multiple Farm Bill

written by Mark D. Jones & John R. Isenhour





RUSSELL GRAVES

MASLOWSKI WILDLIFE PRODUCTIONS

Farm Bill programs have resulted in a suite of ecological benefits across the state. Agricultural practices such as no-till farming (field, above) and programs that create early successional habitat have led to increases in small-game animals and birds such as the Northern bobwhite quail (left). Farm Bill successes in the Great Plains increased the breeding success of waterfowl such as the Northern pintail (above), which winters in North Carolina. Other programs encourage the planting of wildlife-friendly warm-season grasses such as Indiangrass (right) as forage for livestock. Thinned forest stands allow early successional growth and help increase mast production of oaks (acorns, above).

RUSSELL GRAVES

programs into the implementation of major habitat management projects. He enrolled 94 acres of cropland in field border programs, implemented a prescribed burning program to treat more than 200 acres, established 15 acres of native warm-season grasses, planted two acres of native shrubs, and controlled invasive exotic plant species on 20 acres. In addition to these habitat improvements, Bishop permanently protected the farm from future development using funds from the Farm Bill's Farm and Ranch Lands Protection Program (see "Easement Programs," page 9).

"The NCWRC has provided the highest level of technical advice," Bishop says of his experience so far, "and the financial assistance allows us to manage more acres."

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Inside the Farm Bill The term "Farm Bill" causes many people to envision vague legislation pertaining specifically to agricultural practices and having little impact on anyone not connected to farming. In reality, the Farm Bill is a broad, diverse piece of legislation impacting the daily lives of all Americans. It authorizes federal programs addressing a wide array of issues related to agriculture production, food distribution and hunger.

First passed in 1949, the bill focuses on farm programs, covering issues like farm payments, domestic and international agricultural trade, environmental conservation, food stamp assistance, research and education, agricultural lending and credit, agricultural promotion, and rural development. Any changes made to these programs, or to others that have been added over the years, last for approximately 4 to 6 years or until Congress specifies the next legislative rewrite.

The Farm Bill's positive effect on wildlife began in earnest in 1985 with the addition of a Conservation Title in response to the environmental impacts of agriculture. One of the most well-known Farm Bill Programs, the Conservation Reserve Program (CRP), originated then. CRP was originally intended as a soil conservation and water quality program on highly erodible croplands. Basically, farmers rented their land to USDA in exchange for not farming these environmentally sensitive areas.

The program proved successful at protecting soil and water, but it also provided unexpected benefit to wildlife, particularly in Midwestern and Western states. Folks in the arid grasslands of the northern Plains found that CRP created superb year-round upland bird habitat as well as excellent nesting habitat for waterfowl. In those soil types and climates, areas left unfarmed quickly reverted to native grasses and forbs and provided near-ideal habitat for grassland songbirds, ring-necked pheasants, sharptail grouse and ducks. Populations of many of these birds increased from the 1990s until just a few years ago, and even North Carolina citizens far from the Plains benefited from flights of more numerous migrating waterfowl. CRP is perhaps the single most important program in United States history for providing habitat for upland birds and waterfowl.

Since its inception, the Farm Bill has been influenced by politics, science, criticism and cynicism while being shaped by successes, failures and changing resource needs. The recently adopted 2008 Farm Bill follows the trend of complex but effective legislation and offers more opportunities than ever to manage wildlife and other natural resources.

Attempting to read the 663-page text of the actual Farm Bill legislation is an invitation to confusion. The good news is that there is plenty of assistance to help landowners understand Farm Bill opportunities available in North Carolina. The following overview details some programs that fit wildlife habitat management objectives across North Carolina.

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The Environmental Quality Incentives Program (EQIP) Because EQIP is a program that addresses confined animal waste and crop production issues, the Farm Bill requires that 60 percent of its funds be used to improve animal waste problems in the state. However, the other 40 percent can be used to address resource concerns such as wildlife habitat development. EQIP strives to improve natural resources on working lands by incorporating conservation practices, many that benefit wildlife.

Native Warm-Season Grass Conversion: Traditional forage grasses such as tall fescue and Bermuda grass offer little or no value for wildlife. Converting those grasses to drought-resistant native warm-season grasses such as switchgrass, Indiangrass or big bluestem provides high-quality livestock forage that can be managed to provide cover for early successional wildlife species.

Establishing Buffers: Field and pasture buffers planted with a mixture of native warm-season grasses, forbs and shrubs provide habitat for various early successional species. Combining fencing and buffers can improve aquatic habitats by keeping livestock from streams or ponds and reducing nonpoint source pollution.

Increasing the Wildlife Habitat Suitability Index Score: This practice offers landowners a payment for their efforts to improve habitat for declining wildlife species. The index grades habitat based on current and planned conditions. Points are given based on frequency of prescribed burning, forest stand density, forest openings and the overall quality of early successional habitat.

The 2008 Farm Bill opened the door to new opportunities for habitat improvement by including Forest Health and Productivity as resource concerns that EQIP must address. State wildlife biologists work with USDA Natural Resources Conservation Service (NRCS) staff to ensure that wildlife is conserved using forest management practices whenever possible. Applicants who address wildlife habitat improvement in their forest management plan have a better chance of being funded than applicants who do not.

Prescribed Burning: The most cost-efficient wildlife habitat management practice funded through EQIP, prescribed burning promotes early successional habitat and plant species diversity, especially in heavily thinned forest stands.

Reforesting Clear Cuts With Longleaf or Shortleaf Pine: As stands of these trees have declined in North Carolina over the past century, associated ecosystems containing desirable understory plants and associated wildlife have disappeared as well. Stands of longleaf and shortleaf pines provide habitat for early successional wildlife for a longer period of time than loblolly pines because the canopies of longleaf and shortleaf pine are more open and allow more sunlight to reach the forest floor.

Thinning Forest Stands for Forest Productivity and Wildlife Habitat: This practice promotes the thinning of forest stands to a tree density slightly below levels used in stands managed only for forest production. A higher rate of thinning allows more sunlight into a stand and provides more

Top photo: This forest stand was thinned to allow for early successional habitat growth and increased mast production by hardwoods. Below: This cornfield is bordered by a habitat buffer, which is quality habitat for upland birds.

long-term habitat for wildlife, including early successional species, by promoting a more diverse plant understory.

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The Wildlife Habitat Incentives Program (WHIP) WHIP is similar to EQIP in format and practice availability, but directly addresses wildlife habitat without some of the constraints of EQIP. Practices funded with WHIP are directed less towards commodity production and focused more towards simply improving wildlife habitat. Landowners can utilize WHIP funds to improve habitat in forests, fields and pastures as well as aquatic ecosystems. These funds are designed to enhance habitat and ecosystems required by declining wildlife such as early successional species. A portion of WHIP funds are targeted geographically into Habitat Priority Project Areas to help populations over a large landscape.

Early Successional Habitat Development: Plantings of native grasses and forbs can be designed to target songbirds, small game and even beneficial insects such as bees and wasps. If habitat already exists, management practices can be incorporated to enhance its quantity. Selective herbicide application, prescribed burning and rotational disking can be used to maximize habitat quality and prolong the benefit of native grass and herbaceous habitat. Field edges can be cut back or treated with herbicide to keep a tangle of brush, briars and shrubs, which serves as vital winter cover.

Forest Stand Improvement: WHIP practices in forestland are slightly more aggressive than if forest production was the primary objective. Forest openings can be installed and managed for wildlife species that require pockets of early successional habitat. Pre-commercial thinning can be used to allow sunlight to reach the forest floor and revitalize groundcover of grasses and briars that have been shaded out. Crop tree release can be used to remove competition from around mast species such as oak, persimmon and hickory. Releasing these trees not only helps produce more fruit but also promotes the

MELISSA McGAW/NCWRC

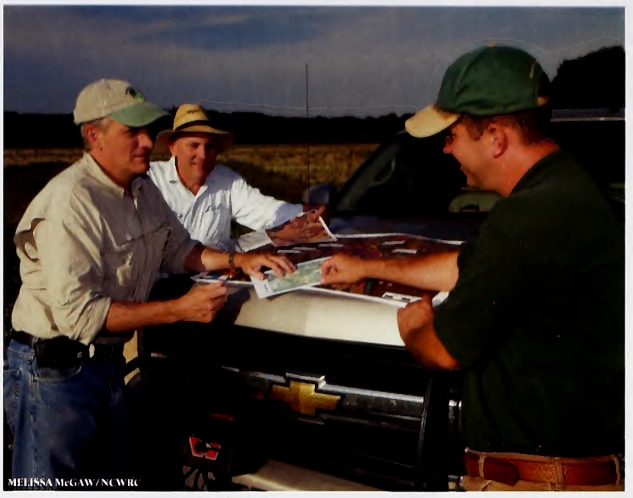
MELISSA McGAW/NCWRC

For More Information

All Farm Bill programs are administered by either the Farm Service Agency (FSA) or the Natural Resources Conservation Service (NRCS). Both of those agencies are located within service centers managed by the U.S. Department of Agriculture. USDA Service Centers are designed to be single locations where customers can access FSA, NRCS, Rural Development and other agencies.

Most North Carolinians live near a USDA Service Center. Find the address and contact information for your area center at http://offices.sc.egov.usda.gov/locator/app. NRCS program information specific to North Carolina can be found at http://www.nc.nrcs.usda.gov/programs.

It is important for landowners to seek professional assistance in making land management plans and applying for financial help. Professional wildlife biologists within the NCWRC's Private Lands Program are available to help landowners develop wildlife-friendly management. Landowners may contact NCWRC's Division of Wildlife Management at (919) 707-0050 to get in touch with a private lands wildlife biologist.



NCWRC technical assistance biologist John Isenhour (green cap and shirt) consults with Anson County landowner John Bishop (tan cap and shirt) and his land manager, Lee Efird. The field of native grasses and forbs (left) was planted using WHIP funds.

A Unique Relationship

In 2002, NRCS and NCWRC staff began working together to maximize Farm Bill funds for significant wildlife habitat improvement. Historically, the Wildlife Commission lacked staff dedicated solely to providing Farm Bill guidance. To solve the problem, the NCWRC emulated state-federal partnerships developed in Kentucky and Tennessee that used Farm Bill technical assistance funds to pay for a portion of staff time dedicated to Farm Bill work. The first of three new NCWRC technical assistance biologists was hired in 2004. Now working in each of North Carolina's geographic regions, these biologists assist NRCS staff and landowners to get wildlife habitat, especially early successional habitat, established.

In the last five years, technical assistance biologists have shaped and influenced Farm Bill programs more than ever anticipated. Thousands of acres of habitat have been planned and installed under their guidance. Significant priority areas have been identified, and landowner outreach has targeted declining habitats in each of the state's regions. As one resource manger said, "They find ways to make it work, not reasons why it won't." This personal support for landowners and NRCS staff has proven a valuable resource to maximize benefit of both state and federal taxpayer dollars while directing available funds to declining species and habitats.

growth of early successional habitat within the treated area. Another beneficial treatment available is one for the control of invasive exotic plant species, which allows native plants to better regenerate.

Riparian and Aquatic Habitat Enhancement: Riparian buffers can be installed to filter runoff and maintain water temperatures as well as provide travel corridors for terrestrial species. Stream banks and channels can be stabilized to reduce erosion and siltation and improve water quality. In-stream structures can be installed to improve aquatic habitat diversity and function for a wide variety of aquatic species. Fish passages can be improved to allow aquatic species to migrate throughout a watershed.

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Conservation Reserve Program CRP has treated millions of acres across the United States since beginning in 1985. CRP contracts are unique because they provide reimbursement for a percentage of the establishment costs of practices and pay an annual rental payment. Across North Carolina, 128,066 acres are enrolled. Some states in the northern Plains have had as many as 4 million acres enrolled at times. To maximize the environmental benefits of CRP, new opportunities were created for CRP enrollment in two specialized programs: Continuous Conservation Reserve Program (CCRP) and Conservation Reserve Enhancement Program (CREP).

One of the biggest changes in CRP has been to focus efforts and funds towards specific critical or declining habitats. This change resulted in the implementation of CCRP in 1996 to address several significant habitat types, including shallow-water wildlife areas, riparian buffers, early successional habitat and longleaf pine ecosystems. Depending on the planned practice, landowners can receive rental payments, installation cost share, management funds and a signing bonus. The conservation practice (CP) the landowner uses depends on their objectives and the history of the land they are enrolling.

Shallow-Water Areas for Wildlife CP 9: Develops or restores shallow-water areas (6-18 inches deep) to improve wildlife habitat. Fallow vegetation can be managed with disking and burning in these impoundments. This practice is available only on cropland.

Filter Strips CP 21: Installs and maintains filter strips from 20–120 feet wide to remove pollutants from crop field runoff to improve aquatic ecosystem quality. Native grasses and forbs in filter strips can improve habitats for early successional species.

Riparian Buffer CP 22: Establishes forested riparian buffers from 35–180 feet wide to exclude livestock, improving water quality and wildlife habitat. Both cropland and marginal pastureland can be enrolled in this conservation practice.

Marginal Pastureland Wildlife Buffer CP 29: Restores native shrubs and herbaceous vegetation in pastureland riparian buffers and excludes livestock to stabilize stream banks, reduce flood damage, and enhance wildlife habitat. Buffers must be 20–120 feet wide and planted with a mixture of native grasses and forbs.

Habitat Buffers for Upland Birds CP 33: Establishes buffers to enhance early successional habitat around the perimeter of eligible cropland. These buffers are 30–120 feet wide

and can be fallow or planted with native vegetation. Periodic management with fire, herbicides or disking is required to maintain early successional benefit.

Longleaf Pine Establishment CP 36: Establishes and manages longleaf pine forest habitat. Land enrolled must be cropland with an official cropping history and fall within priority areas. This program is designed to increase acreage of the threatened longleaf ecosystem within its historic range while providing habitat for many important and declining wildlife species.

SAFE Program CP 38: This practice can be utilized to convert and manage entire fields in early successional habitat. The program was developed to maximize grassland bird habitat on a landscape scale in Bertie, Edgecombe, Halifax, Hertford, Martin, Nash, Northampton and Wilson counties.

Water quality and reduction of nonpoint source pollution within the nation's watersheds have become special focuses of CRP. This led to the creation of CREP, which combines USDA Farm Bill funds and state funds to address these resource concerns. CREP addresses water quality resource concerns by installing riparian buffers on cropland and pastureland as well as offering 10-year, 30-year and permanent easement opportunities on riparian sites.

Areas from the Yadkin-Pee Dee River basin east may apply for CREP funding. Several of the same practices available within CCRP can be utilized within CREP, including CP 21 and CP 22. Program specifics can be complex depending on length of contract, practices selected and acreage impacted. Landowners may receive increased rental payments, installation cost share and management funds in CREP contracts.

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The Farm Bill has a long history of providing environmental benefits across the nation. If you are a landowner with a desire to improve your wildlife habitat by receiving cost share from the federal government and expert help from the Wildlife Commission, the Farm Bill may have something for you. ◆

Mark D. Jones is a Supervising Wildlife Biologist and John R. Isenhour is a Technical Assistance Biologist with the NCWRC's Private Lands Program. Technical Assistance Biologists Don Barker and Patrick Farrell also contributed to this story.

A Farm Bill Planning Guide for Landowners

- Develop a list of primary objectives for your property and rank them by importance. For example, do you wish to manage for recreation, timber production, wildlife diversity, soil and water quality, agricultural production, hunting, or other reasons?
- Expand your primary list to spell out detailed objectives for your top four or five primary objectives.
- Involve natural resource professionals—NCWRC, NRCS and perhaps others—with expertise in the fields that address your detailed objectives.
- Develop a written document that you are willing to follow. The document should be specific enough to address current objectives but flexible enough to allow for future changes.
- Research available funding programs and modify plan details to meet program requirements if feasible. Do not give up your objectives just to meet program requirements.
- Sign applications with funding agencies after careful planning and discussion, and make sure you are meeting your objectives.
- Once awarded a contract, review the contract requirements, practice schedule and reimbursement amounts prior to signing. Ask questions and voice concerns at this time.
- Implement habitat improvements on your property according to the contract schedule. Keep in touch with the funding agency and technical advisors to ensure progress in implementation, possible plan modification and future funding opportunities.

Easement Programs: Long-term Land Protection

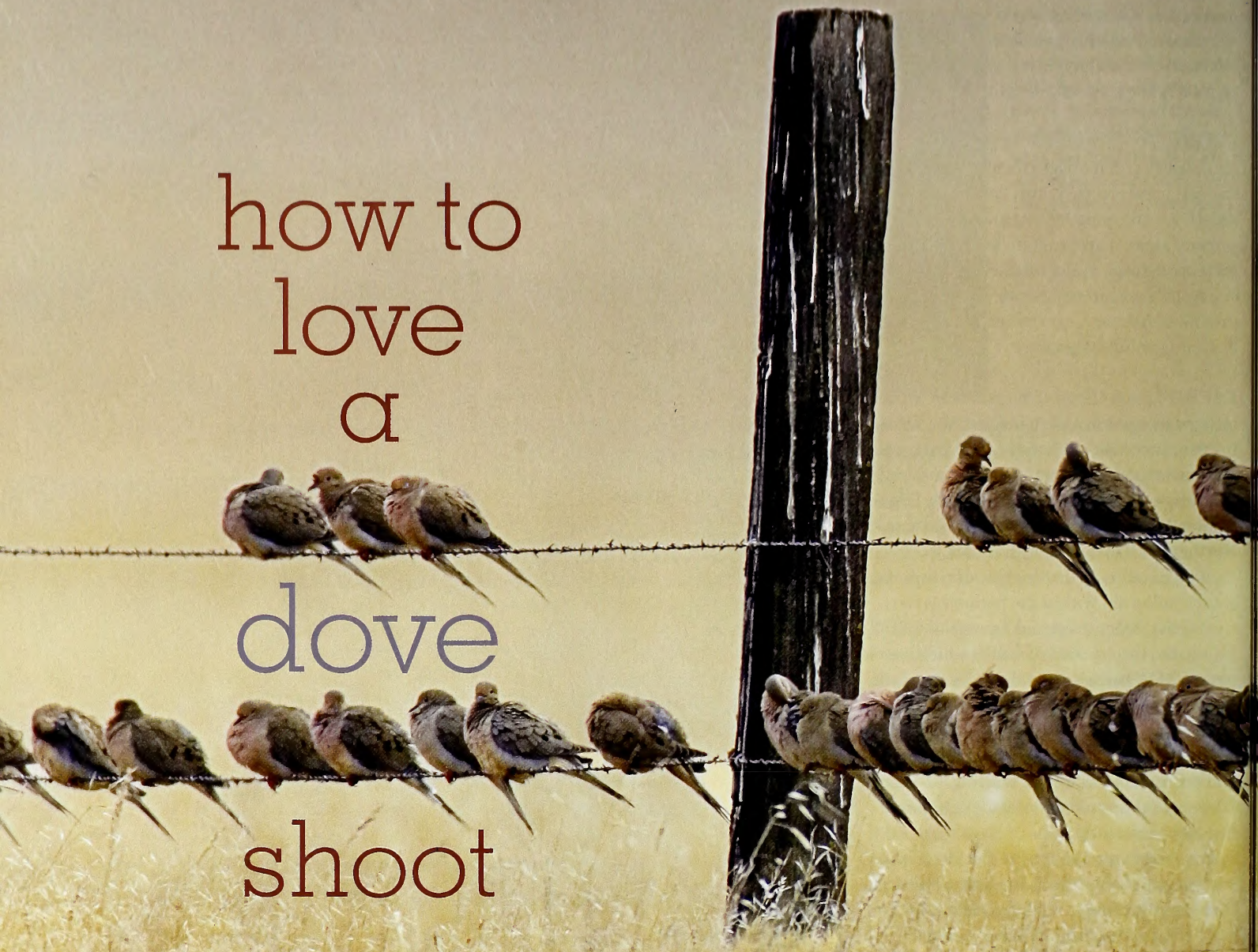
Three easement programs are available in North Carolina under the 2008 Farm Bill to protect valuable land from development, protect critical or endangered habitats, and to preserve the state's natural beauty. All easement programs are voluntary and provide compensation to the landowner in exchange for the relinquishment of development rights.

The Farm and Ranch Lands Protection Program (FRPP) provides matching funds to help purchase development rights and keep productive farm and ranchland in agricultural uses. All FRPP easements are permanent.

The Grassland Reserve Program (GRP) offers landowners the opportunity to protect, restore and enhance grassland, rangeland, pastureland and certain other lands on their property. Participants limit future development and cropping uses of the land while retaining the right to conduct common grazing practices and operations related to the production of forage and seeding. Management is subject to certain restrictions during nesting seasons of birds that are in significant decline or are protected under federal or state law. All GRP easements are permanent.

The Wetlands Reserve Program (WRP) allows landowners to protect, restore and enhance wetlands on their property. NRCS provides technical advice and financial support. In North Carolina, WRP currently offers 15-year restoration easements and permanent easements.

how to love a dove shoot



Get the most out of your day afield through smart preparation. The right work in midsummer can make a big difference in September.

Written by Dan Kibler
Photographed by Russell Graves

A mourning dove is a tiny bird, really, more feathers than substance. Cleaned and picked, wings clipped off and with only the breast remaining, a dove is roughly the size and shape of the pyramid sinker you clip to the end of your bottom rig when you're surf-fishing in the fall.

Except that it weighs a lot less.

But a dove has a lot in common with that sinker. First of all, both are pretty much a nondescript gray color. A dove is a beautiful bird, but compared to the plumage of a quail, a ruffed grouse, a drake mallard or a tom turkey, it's no artistic success. Second, it likely took as much lead to kill that dove as went into making that sinker—4 to 6 ounces. That makes a dove a pretty expensive little morsel; figuring an average of four shells per bird, that's roughly 3 pounds of lead for each dozen-bird limit—if you're a decent shot.

But putting food on the table isn't the primary reason that so many hunters set aside Labor Day and a lot of September Saturdays to be in a cut grain field somewhere, sitting on a bucket, sweating profusely, banging their shoulders to a pulp. It's more that dove hunting is a tradition throughout North Carolina and much of the South. It's a social event that can be shared with friends and family. It may be Junior's first trip afield with his own gun. Dove season is a harbinger of things to come, the hunting version of baseball's spring training, before deer, quail and waterfowl seasons.

Getting the most out of a handful of dove hunts makes each one more memorable, and it's not difficult. Here's what you need to invest to make it happen.

> A couple of days planting a field and a couple preparing it for Opening Day

> An afternoon the week before the season sitting back in the shade to see when and how the birds come into the field

> Maybe an hour sketching out a map of the field with places for each hunter drawn in

> An hour at the local shooting club busting clay pigeons to get your shooting eye back

> A trip to the mom-and-pop sporting goods store out in the country to get the good shells that the Monster-Mart back in town doesn't carry

That's not really much of an investment for the reward of a great afternoon afield with friends.

First, the field. Spaced properly, a dozen hunters can safely hunt a field that's barely 4 or 5 acres in size, given that it may not be a perfect square or rectangle. A hunter with a field leased for dove season, especially if he can plant and prepare it himself, is way ahead of the game.

Doves are not picky. They want food, water and a place to rest. Their meals are almost entirely seeds, though they need to make a stop to get some grit for their craws. A lot of doves are killed over cut cornfields, but very few of those are harvested at the right time for a Labor Day weekend opener; and when the farmer goes in with the combine, the entire field is cut right down to the surface. Then the only places for a hunter to hide are around the edges.

Four other grains are immensely popular among dove hunters: millet, sunflower, sorghum and Egyptian wheat. The most popular blends of millet will mature about two months after planting, so late June is about right. With North Carolina hunters getting a three-part season—September, Thanksgiving week and December–January—planting millet and another grain in the same field, at the same time, may put a lot of seed ready for opening day, and a second crop ready 10 weeks later for the second season. Generally, hunters like to have their grain crop ready

about a week to 10 days ahead of their first hunt, so the birds can find it and start to use it daily.

Legally, a field is not considered baited if the planting and harvesting of the crop follow common, accepted agricultural practices. You can cut or harvest a field just for the purpose of shooting doves as long as no grains are added after the fact. A good rule of thumb is that if it grew there and you cut it down there, it's probably okay. If it didn't grow there and you just scattered it on top, it's probably illegal.

Many dove hunters like to plant then harvest or cut their grain fields in strips. Sunflowers, sorghum and Egyptian wheat all grow quite a bit taller than millet, and many organizers of dove hunts like to plant several rows of those taller grains in the middle of a field or around a field edge or ditch bank to provide hiding places for hunters.

what doves want

Doves prefer several things to be present before they'll start feeding in a field. Most important, the grain has to be on the ground. Second, they really like to land on clean ground instead of in high weeds, which can hide predators. The clean ground makes it easier for them to find grit and seed. Harvesting or cutting wide swaths of grain the length of a field—leaving narrower strips for cover—will provide doves with visible food and security and leave hiding places for hunters.

Doves love big, open trees around a field. They prefer to land, and roost, in pines, because they can more easily look out on their surroundings. Other narrow-leaved trees such as sassafras, cherry or chinaberry are also excellent drawing cards for doves, and a big dead hardwood at one end of the field is great to have. On one hunt I attended in Franklin County years ago, the owner of the farm pointed out a dead tree, and a large percentage of the doves that entered the field keyed on that landmark. The tree hadn't been dead long; the farmer had taken a chain saw to the trunk and roughed up the bark enough to kill the tree without cutting it down.

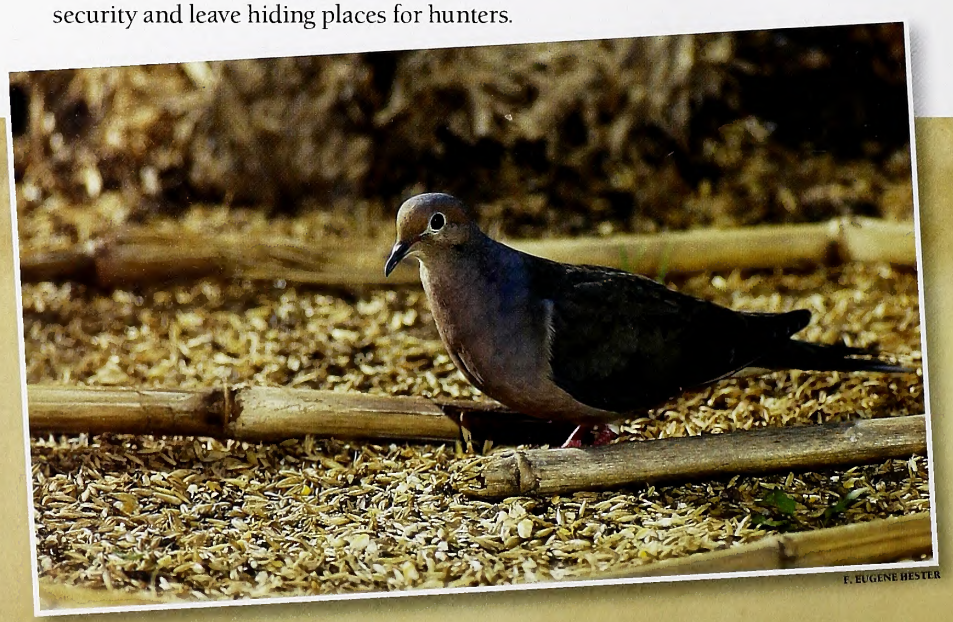
Power lines, hedgerows and points of woods that break up the rectangular outline of a field are great places, because doves often route their flight paths along unusual structure. They'll often land on power lines before actually dropping down into a field to feed, and savvy hunters take advantage of this habit by placing hunters along the power line, even using a rod and reel to cast plastic dove decoys over the power cables to attract live birds.

Decoys—either silhouette or full-bodied—are excellent tools for focusing the attention of incoming birds. Decoys can be mounted on the limbs of dead trees, on fencing or in feeding positions on the ground in fields that are cut clean. On one hunt in Cumberland County, a buddy of mine climbed a tree on the edge of a millet field, tied a strand of monofilament fishing line to a limb, strung the line all the way across the 75-yard-wide field, then tied the other end in a tree on the other side, about 10 feet off the ground. A folding ladder gave him access to the mono, and using clothespins, he clipped silhouette decoys to the line. The first flight of birds that came in was a good 50 feet high. When they spied the fakes, they dropped down to eye level faster than the steepest roller coaster you've ever seen.

Scouting before a hunt doesn't need to be extensive. Just go one afternoon a few days ahead of time and observe how doves enter the field and when they arrive. Doves will come in from the same direction on a daily basis, using almost the same flight paths because they're visiting the same roosting, feeding and watering areas. This allows you to decide where the best areas in the field will be for shooting and hiding hunters. It can also allow a hunt organizer the opportunity to put the poorest shooters in spots where they'll get easier incoming birds instead of more difficult passing shots. Those easy spots are usually in the middle of a field where strips have been left uncut for cover. Gaps in forested areas around a field are natural drawing spots for doves to enter or leave.

timing the hunt

Timing is the other important part of the equation. In North Carolina, hunters must



F. EUGENE HESTER

The ingredients for a successful hunt are few: doves, a harvested field of foxtail millet or other grain, and maybe a few decoys.

wait until noon each day on the first week of the season, after which they can start hunting one-half hour before sunrise. It's a given that some fields are 1:30 fields, some are 2:30 fields and some are 4:30 fields. That's when the most birds will show up and the best shooting will take place. One afternoon devoted to keeping a close watch will tell you when to place the guns once the season opens.

Gaps in forested areas around a field are natural drawing spots for doves to enter or leave.

Early in the season, shooting is usually better later in the afternoon because more of the doves are resident birds. Heavier than doves that are in the midst of a migration, resident birds don't have to spend as much time feeding in the field. An hour may be all it takes for one to get his fill. On the other hand, birds that have migrated in from Virginia and other mid-Atlantic states are more worn down and have to feed longer each day. They're more likely to start soon after noon, so hunts later in September may be better earlier in the afternoon as more migrating birds enter an area.

That leaves equipment, and that's an area where many hunters err. Doves are not particularly intelligent, and they don't have good eyesight when compared to hawks or turkeys. Camouflage clothing isn't mandatory, but it certainly helps conceal a hunter better than blue jeans and a white T-shirt. Also, being able to sit still until the last second before swinging on a dove will improve your chances of making a successful shot. Movement will cause a dove to flare more often and more quickly than anything else. Hunters can buy dove stools or seats at almost any store that carries hunting equipment. I like to scrounge around and get a 5-gallon bucket that previously held paint or sheet-rock mud, clean it out, spray-paint it green or black, and sit on it. I keep a large hole cut in the plastic lid, big enough for me to drop in doves or reach down and get more shells when I need them—but not so big that my hind parts fall in.

And now, about guns. A dove isn't a difficult bird to kill. Its feathers are fairly thin; you don't need copper-plated No. 4s or 6s to penetrate to vital areas. Loads that put a large amount of relatively small shot in your pattern are much better—say, 8s and 9s. And go ahead and spend an extra 50 cents per box to get a quality shell—many of the loads that are sold at cut-rate prices the week before Labor Day don't carry much of a punch. Shoot at least an 1⅛-ounce load out of a 12-gauge gun or a 1-ounce load out of a 20. Many hunters who aren't fans of recoil will leave their 12-gauge guns at home and bring 20-gauges to the dove field, and semi-automatics are popular because the operation of the recoil system deadens some of the kick.

Likewise, a tight-choked gun is usually not necessary, since the great majority of shots will be taken at 25 yards, not 45. Improved cylinder is probably the best all-around choke for a dove gun. The only time you'll need modified is when most of the doves are shot passing through instead of heading in for a meal.

When you've got all of that taken care of, just sit still. Hey, there's two coming in over that oak tree at 9 o'clock. Let 'em get in range . . . closer . . . OK, take 'em! ◆

Dan Kibler is a veteran outdoor writer who lives in Winston-Salem. He is a longtime contributor to Wildlife in North Carolina *magazine.*

F. EUGENE HESTER

F. EUGENE HESTER

NATURE'S WAYS

How Do Doves And Other Birds Breathe In Flight?

See Nature's Ways, page 39.

Tangled up IN GEAR

At what point do the tools of hunting and fishing obscure the fundamentals of the hunt? Written by Jim Wilson Illustrated by Jackie Pittman

"Our inventions are wont to be pretty toys which distract our attention from serious things. They are but an improved means to an unimproved end."

–Henry David Thoreau, "Walden," 1854

As a man ages, he finds himself ensnared in complications, many of which are unavoidable, symptoms of the chronic malady that is adulthood. Careers, marriages, children, homes, insurance and retirement spin out insidious entanglements that can leave him feeling like a fish stuck tight in a gill net.

For hunters and fishermen, our pursuits also become complicated. Most of us neither hunt nor fish for a single species. We hunt ducks, deer, turkeys and quail; we fish for largemouth bass, trout, striped bass and red drum. One day we look about and realize we have accumulated impressive collections of gear, the stuff we need whether we need it or not.

If buying too much gear were a crime, you'd see my mug shot every time you walked into the post office. I have been easily seduced by the shiny looks of a fly rod, wispy and perfectly balanced in the hand, and the elegant lines of an older side-by-side with a European accent, used but still firm when mounted to the shoulder. Gear tugs at my sleeve, promising what times we'll have if only I whip out some cash and take it home. I generally have been an obliging fellow.

Gear can be divided into two classifications: basic equipment and gadgets. The former comprises such things as rods, reels, shotguns, rifles, boots, knives and ammunition, the tools we require to hunt or fish. Those tools are continually being improved, although in many cases the improvement is more a matter of tinkering or refining. For example, is a shotgun manufactured today significantly better than one of 50 years ago? In most cases, not really, at least as regards its function: Point shotgun, pull trigger, gun goes boom, bird falls dead. On the other hand, some gear is demonstrably improved. Is Gore-Tex clothing better than waxed cotton at keeping a hunter or angler dry? Definitely yes, but as it ages, it has no soul.

As hunters—and fishing is but another form of hunting—we must consider gear because we are concerned with ethics, with the rightness of how we pursue and sometimes kill game animals and fish. Humans already possess most of the advantages when it comes to hunting. Is adding yet another advantage through better gear the fair thing to do?

Does better ammunition or lighter, waterproof boots convey another advantage to the hunter? Does fluorocarbon line or scent-impregnated lures give the fisherman an additional edge? The answer to all would be yes. But all those items do not provide advantages unless the hunter or angler already has the skills to use them. There must be a foundation of skills before the advantage is realized.

Sometimes, better gear does not even provide an advantage. An expensive shotgun, for example, isn't going to provide an edge for the hunter. I can shoot quail just as well with an $800 CZ side-by-side as I can with a $130,000 Purdey, I just wouldn't look as sophisticated doing it. (Foreseeing no sudden economic boon, I shall sadly remain unsophisticated afield.) A Purdey, like other bespoke shotguns, is handcrafted, fitted to the individual shooter and adorned with fine engraving that adds considerably to the price of the gun. It is both art and weapon. It will not, however, kill a quail deader than an inexpensive side-by-side. Because it is fitted, a hunter might shoot more accurately with a bespoke gun than one right out of the box, but any shotgun can be altered to better fit the shooter.

THE PROBLEM WITH GADGETS

The other type of gear, the evil twin of basic equipment, is gadgetry—contrivances such as range finders, two-way radios and ATVs that make killing an animal easier, eliminate skill and hard work and give the hunter additional advantages over game. If an animal's few advantages are eliminated, there is no hunting; there is only shooting or culling. The appeal of the hunt is gone because its outcome is assured.

As inanimate objects, gear is neither good nor bad. It's the application of gear that becomes problematic. For example, there is nothing inherently wrong with two-way radios. If, however, one hunter uses his radio to direct another hunter to a deer headed in his direction, then that violates the principles of fair chase. The Boone and Crockett Club, keeper of North America's big-game records, agrees and will rule ineligible any animal taken with the "use of electronic communication devices to guide hunters to game."

Boone and Crockett also wants no part of "artificial lighting, electronic light intensifying devices (night vision optics), sights with built-in electronic range-finding capabilities, thermal imaging equipment, electronic game calls or cameras/timers/motion tracking devices that transmit images and other information to the hunter."

Some forms of hunting and fishing demand more basic gear than others. Waterfowl hunting is one of the most gear-intensive pursuits. Some dedicated waterfowlers even have separate storage facilities for their multiple decoy rigs. In addition to warm-weather and cold-weather clothing (including multiple pairs of waders), and a dog and all that entails, there's the matter of a boat, which entails a good deal more than a dog. Conversely, squirrel hunting is the apogee of minimalism; a .22 rifle and clothing suited for rambling through the woods are all that's needed.

Fishing can be a minimalist activity, but most of us don't go about it that way. If you happen to fly-fish and use spinning and bait-casting gear too, you can quickly accumulate heaps of rods, reels and line. And spend handsomely to do so. (Actually, you can spend handsomely on any of the three individually, especially fly-fishing.) Lures and flies constitute a different genre of gear accumulation, primarily because we tend to lose them to fish or underwater obstructions or trees on the bank. Few lures reach old age. So, yes, I do need a dozen or so Rattlin' Rapalas or popping bugs in various sizes and colors. The colors, however, are probably more enticing to the angler than to the fish.

You must have tackle boxes and fly boxes for storing all those lures, plus pliers, nippers, line, terminal tackle and handfuls of gadgets that looked useful but proved disappointing. A boat, obviously, also goes well with fishing. There's also the matter of an outboard motor, a trolling motor and a lengthy list of optional gear.

Despite having six or seven tackle boxes—one of which is devoted to holding lures I don't need often or those few that I've retired—I've found that on most fishing trips, I could fit the lures I'm going to use in a small sack, the size that would hold a couple of pounds of cornmeal. But being an opportunistic angler—if it's biting, I'm willing to fish for it—I carry an assortment of lures from 1/32 ounce up to 1 1/2 ounces, plus a selection of dry flies, streamers and terrestrials and the appropriate rods and reels to fish them. My destination is often eastern North Carolina, where I might catch freshwater and saltwater species in the same body of water. And Pamlico Sound beckons just a few miles away. Beyond a handful of popping bugs, crankbaits, Beetle Spins, spoons and spinnerbaits, most of those lures remain in the tackle box.

Some lures I know I'm not going to use simply because I don't like to fish them. I'd just as soon listen to a lecture on 15th-century French poetry—in French—as use plastic worms. I just don't care for the pace of fishing with worms. I still carry some just in case the fishing gods are particularly peckish and that's the only lure that will get a fish to the boat. I realize that it's illogical. Plastic worms catch a lot of bass; I've landed very nice fish with them.

The first largemouth I ever caught on an artificial lure sucked in a Creme worm, the weedless variety tricked out with a handful of red beads and spinners. More than four decades later, those original Creme worms are still overdressed, like the girl you'd park in a dark booth at PeeWee's Roadside Lounge but not dare escort to the church pig-pickin'.

FEEDING THE ADDICTION

Like many hunters and fishermen, I grudgingly will admit to having too much gear. I also won't deny that I will buy more, despite having a large canvas bag in which I keep equipment for which I have yet to find a home. In other words, I don't use that gear much because everything is dumped in the bag, and it's frustrating to go elbows deep sorting through it. Sometimes, too, I realize that I'm searching for a piece of gear that I only thought about buying and didn't (although that indicates to me that I do indeed need that particular item).

Lures and flies constitute a different genre of gear accumulation, primarily because we tend to lose them to fish or underwater obstructions or trees on the bank.

And yet, the weighty Cabela's Master Catalogue sits beside my chair in the den, all 700-odd pages of it, a tribute to what author David Petersen calls our "gadget addiction and Pavlovian consumerism." Catalogs from Bean, Orvis, Bass Pro and half a dozen others rest in the same pile.

So, what's the harm in this intemperate accumulation of basic (and I'm using that word very loosely) gear? Probably not much, if you ignore the expense, the aggravation of having too much stuff and the lack of room to store it properly. We purchase clothing, another form of gear, intentionally or unintentionally creating an image of ourselves that makes us content, whether it's a tweed shooting jacket with leather elbow patches, or technical fishing shirts we wear when we're buying a sheet sander at the Home Depot, or camo hunting coats for eating smoked turkey legs at the State Fair. We dress for the hunt more than we hunt.

The worst thing about having so much of this gear is that it puts us perilously close to the situation Spanish philosopher José Ortega y Gasset discusses in "Meditations on Hunting," that of "confusing the hunt itself with that which merely *has to do* with it." Buying gear becomes as much a pursuit as hunting and fishing.

As I have realized that what I always took to be my minimalist existence is a delusion that has gained purchase in the thin soil of my mind, I've begun to wonder what Aldo Leopold's reaction might have been had he lived long enough to flip through a Cabela's catalogue.

At the very least, he would have plenty of material to reprise "Wildlife in American Culture," his famous 1943 essay in which he criticizes "gadgeteers" (sporting goods dealers) and the outdoor press for degrading hunting. "He [the gadgeteer] has draped the American outdoorsman with an infinity of contraptions, all offered as aids to self-reliance, hardihood, woodcraft, or marksmanship, but too often functioning as substitutes for them," Leopold wrote.

And that remains the problem. Although basic gear allows us to experience hunting and fishing, gadgets deny us crucial pieces of the experience. Gadgets—the latest in technology—can eliminate the doing and the learning that are vital to hunting and fishing. They do nothing to make us hunters or fishermen; they hinder us from becoming either.

Missed a turkey from 25 yards last April? Go buy a fiber optic sight. Having trouble judging how far away that whitetail is that's standing in a bean field? Get yourself a range finder. Can't figure out where the fish are? Buy a fish finder.

There are arguments for those devices. If I have a range finder, you might say, then I would know that deer that I thought was 175 yards away was actually 300 yards away. True. But that also means you can't

Although basic gear allows us to experience hunting and fishing, gadgets deny us crucial pieces of the experience. Gadgets—the latest in technology—can eliminate the doing and the learning that are vital to hunting and fishing.

tell distance from squat. That's a skill learned from experience. You can, however, use a range finder as an aid to learning distances, which is different from hunting with one. Or you could simply walk off distances in a field, familiarize yourself with what 150 yards looks like and save a few hundred dollars.

You also might say, *If I have a fish finder, then I don't have to waste my time casting to empty water.* Again, true enough, if you dismiss the fact that part of the charm of fishing is the mystery of what might be on the end of your line or the satisfaction of figuring out where the fish are on your own. I'm not a commercial fisherman who makes his living by catching fish as efficiently and quickly as possible. If there are no fish where I'm fishing, I'll figure that out sooner or later. I'm in no hurry. Some days I might not even care. As novelist Thomas McGuane says, "Angling is extremely time consuming. That's sort of the whole point."

It might be a curious comparison, but golf is in an analogous situation to hunting and fishing in the gear arena, except that golf equipment manufacturers came right out and labeled their gadgets "game-improvement." The irony is that since game-improvement clubs and jacked-up balls debuted in the 1980s, the national average handicap, which is about 16, has barely budged. Golfers are spending money but not reaping the rewards, particularly golfers with higher handicaps. The golfers who have benefited the most from the new clubs and balls are the professionals and top amateurs, the ones who already had spent years learning the game. The lesson is simple: You cannot buy a golf game.

The same is true for hunting and fishing. Gadgets will not make you better. They can make you a more efficient harvester or culler, but not a better hunter. You can practice your marksmanship, spend time in the woods or on the water, take shooting or casting lessons, but you cannot slap down your money on the counter and buy those skills without the work.

Hunting and fishing are lifetime quests that are never finished. That is part of their hold over us. The hunt is a process forever in evolution. We learn as we hunt, and by applying that knowledge — consciously or subconsciously — to the next hunt, we make each successive hunt incrementally different than the one before. "A good hunter's way of hunting," Ortega writes, "is a hard job which demands much from man."

Hunters and anglers often even choose to handicap themselves, perhaps using a two-shot over-and-under rather than a semi-auto shotgun with three or five shells. Some bird hunters have found pleasure in returning to hammer shotguns of a century ago. Simply by using artificial lures, anglers limit their catch. Natural bait is almost always going to catch more fish than artificial. A fly-fisherman might choose to fish only dry flies, preferring to catch fewer fish in the manner he desires rather than more by using a nymph or streamer.

LEARNING AND HUNTING

Hunting and fishing are vital for many of us, partly because they do involve the accumulation of knowledge and skills. We learn a little biology about the game or fish we chase or even don't chase, a little about botany, agriculture, insects and other critters. We learn to tie knots, observe wind direction and clouds, notice a particular feel in the air when the weather is about to turn. We find pleasure in those days when the hunting or fishing is poor by observing. One of my favorite recent hunts took place in the woods of Granville County. I never saw a turkey, despite hearing them a few hundred yards away, but I did get to watch a red-bellied woodpecker excavate a hole in a dead hardwood. The bird would drill away inside the tree for a bit, re-emerge and flick its head to scatter the bits of wood in its bill on the leaves and pine needles at my feet. I credit hunting with giving me the opportunity to see that.

It's nearly impossible not to learn something when you're hunting or fishing. Perhaps most important, we also learn about ourselves, about how we act when we are alone with no one looking. Riding an ATV and sniffing gas fumes on the way to a deer stand set up near an automatic feeder spitting out corn does not allow much learning, at least not about this important business of hunting.

If you are an older or handicapped hunter and riding an ATV to your stand is the only way you can hunt, then have at it. It's better than not going. At its finest, however, hunting is a shedding of the present, its concerns and trappings, and retreating to the past and experiencing the hunt as simply and purely as possible. The more gear we tote around, the less that type of hunting is possible.

Leopold admitted that he himself could not define what moderation was in the accumulation and use of gadgets, or what gadgets were legitimate and illegitimate. "I use many factory-made gadgets myself," he wrote. "Yet there must be some limit beyond which money-bought aids to sport destroy the cultural value of sport."

As a man who chose to hunt deer with a wooden longbow he made himself, Leopold would be disappointed with modern bowhunting. In 1943 Leopold thought that bowhunting might help turn back the technological tide. "Defenders of the American tradition still exist. Perhaps the bow-and-arrow movement and the revival of falconry mark the beginnings of a reaction." I suspect that modern compound bows with fiber-optic sights and carbon arrows with expanding broadheads were not what he had in mind. Bows and muzzleloaders — once referred to as "primitive" weapons — today have little in common with the bows and black-powder rifles that were their ancestors.

And yet, hunters have always tried to improve their gear. We have progressed from rocks to spears to nets and traps to bows and firearms. The problem is not the weapons but the ancillary devices, those things that change us from hunters into cullers.

Perhaps we can realize Leopold's limit only when we have exceeded it. And when we have passed that limit, who among us turns back?

Ultimately, gadgets degrade hunting by emphasizing the erroneous belief that the kill is the ultimate objective. Most hunting programs on television epitomize this idea; they almost always end with a kill. Ortega is famous for his quote "One does not hunt in order to kill, one kills in order to have hunted." But Ortega is equally to the point, if less pithy, when he writes: "*It is not essential to the hunt that it be successful.* On the contrary, if the hunter's efforts were always and inevitably successful, it would not be the effort we call hunting, it would be something else. . . . The beauty of hunting lies in the fact that it is always problematic."

Hunting is a process, both practical and mystical, and if the process is subverted, with chunks of it stripped away and tossed aside, then we are left with something less fine than what it should be. What remains is Thoreau's unimproved end. ◆

Jim Wilson is the associate editor of Wildlife in North Carolina.

North Carolina Hunting Seasons 2009–2010

SPECIES		HUNTING SEASON	DAILY LIMIT	POSSESSION	SEASON
BLACK BEAR		See *Regulations Digest, P. 40*	1	1	1
DEER[1]			2	6[2]	6[2]
	Bow and Arrow	Sept. 12–Oct. 9 (Eastern) Sept. 7–Oct. 3 and Oct. 12–Nov. 21 (Western) Sept. 12–Nov. 6 (Central) Sept. 12–Nov. 13 (Northwestern)			
	Muzzleloading	Oct. 10–Oct. 16 (Eastern) Oct. 5–Oct. 10 (Western) Nov. 7–Nov. 13 (Central) Nov. 14–Nov. 20 (Northwestern)			
	Gun	Oct. 17–Jan. 1 (Eastern) Nov. 23–Dec. 12 (Western) Nov. 14–Jan. 1 (Central) Nov. 21–Dec. 19 (Northwestern)			
	Urban Archery Season *(participating municipalities only)*	Jan. 9–Feb. 13			
WILD BOAR		Sept. 7–Feb. 28[3]	1	1	2
WILD TURKEY	Male Or Bearded Only Youth Hunt (Male Or Bearded Only)	April 10–May 8 April 3 *(statewide on private land)*	1 1	1	2
EARLY CANADA GOOSE SEASON		Sept. 1–Sept. 30	15	30	None
DOVE		Sept. 5–Oct. 10 (noon until sunset on Sept 5; thereafter, shooting hours are ½ hour before sunrise until sunset) Nov. 23–Nov. 28 Dec. 19–Jan. 15	15	30	None

SPECIES		HUNTING SEASON	DAILY LIMIT	POSSESSION	SEASON
RAILS, MOORHEN & GALLINULE	Moorhen & Gallinule	Sept. 5–Nov. 13	15	30	None
	Clapper Rail, King Rail	Sept. 5–Nov. 13	15	30	None
	Sora Rail, Virginia Rail	Sept. 5–Nov. 13	25	25	None
EARLY TEAL SEASON[4]		Sept. 12–Sept. 30 (east of U.S. 17 only)	4	8	None
COMMON SNIPE		Nov. 13–Feb. 27	8	16	None
WOODCOCK		Jan. 1–Jan. 30	3	6	None
RED & GRAY SQUIRREL		Oct. 1–Feb. 13	8	None	None
FOX SQUIRREL		Oct. 12–Dec. 31 (only in 23 counties; season closed elsewhere; see *Regulations Digest, P. 50*)	1	2	10
RABBIT Including Box Trapping		Nov. 21–Feb. 28	5	10	75
QUAIL		Nov. 21–Feb. 28	6	12	None
RUFFED GROUSE		Oct. 12–Feb. 28	3	6	30
PHEASANT Non-native Male Pheasant Only		Nov. 21–Feb. 1	3	6	30
RACCOON & OPOSSUM[5]		Oct. 12 (sunrise)–Feb. 28	No restriction on opossum; see *Regulations Digest, P. 50*, for raccoon		
BOBCAT[5]		Oct. 12–Feb. 28	No restriction		
FOX		Nov. 21–Jan. 1 and Jan. 2–Jan. 23	Limited to certain counties, see *Regulations Digest, P. 50*		
MIGRATORY WATERFOWL		Federal regulations may be obtained at www.ncwildlife.org or by calling toll free 1-800-675-0263 after Labor Day			
COYOTE		No closed season or bag limits. Electronic calls allowed			
GROUNDHOG		No closed season or bag limits			
NUTRIA		No closed season or bag limits			
BEAVER		See *Regulations Digest, P. 51*			
CROW		Wed., Fri., Sat. of each week from June 3 through the last day of February. See *Regulations Digest, P. 52*, for additional holiday hunts. (Seasons shown are valid through June 30, 2010) No bag limits			
STRIPED SKUNK		No closed season or bag limits			

[1] See *2009–2010 North Carolina Inland Fishing, Hunting & Trapping Regulations Digest* for approximate boundaries of Eastern, Central, Northwestern and Western deer seasons. For a copy of the *Regulations Digest*, write: N.C. Wildlife Resources Commission, 1722 Mail Service Center, Raleigh, NC 27699-1722 or visit www.ncwildlife.org.

[2] See *Regulations Digest* P. 41 for buck bag limits.

[3] In Cherokee, Clay, Graham, Jackson, Macon and Swain counties. In the other 94 counties, feral hogs are not considered to be wild boars, and the commission does not regulate them.

[4] Includes blue-winged, green-winged and cinnamon teal.

[5] The bobcat, raccoon and opossum seasons are closed in the Harmon Den and Sherwood bear sanctuaries in Haywood County.

MELISSA McGAW / NCWRC

TOP | SHELF TRAINING

Working to detect and prevent boating under the influence on the waters of our state, the N.C. Wildlife Resources Commission's Division of Enforcement is the go-to agency for BUI training.

It was quite the celebration for nine young professionals, having a lively time of conversation and cocktails on a Wednesday evening at a class party. Drinks flowed, and laughter filled the room. Only this class was a Boating Under the Influence (BUI) detection and prevention course, and the partygoers were study subjects. Every drink for the volunteers was carefully measured, every drinker closely monitored. The students observing in this case were 23 wildlife enforcement officers of the N.C. Wildlife Resources Commission.

North Carolina law prohibits boating under the influence. It does not permit anyone with a blood alcohol concentration of .08 or higher — or appreciably impaired by any combination of alcohol, controlled substances or medications — to operate a recreational vessel. Penalties may include fines up to $1,000 and jail.

It is the job of wildlife enforcement officers to enforce boating laws and regulations on the waters of the North Carolina. In the course of their duties, they patrol more than 5,000 square miles of inland streams, rivers, lakes and coastal waterways and perform boating accident investigations. They do this important work all hours of the day, every day of the year.

WRITTEN BY GEOFF CANTRELL

During the course of Boating Under the Influence (BUI) training, NCWRC wildlife enforcement officers monitor a class of volunteer subjects who are receiving carefully measured amounts of alcohol. These classes give officers an opportunity to observe the real-world effects of alcohol, helping them to be better prepared for what they might observe out on the water.

ALL PHOTOGRAPHS ON THESE TWO PAGES TAKEN BY GEOFF CANTRELL / NCWRC

Over 20 percent of boating-related fatalities are alcohol related. It is not worth the risk while operating a boat—any boat—anywhere.

PARTYING FOR A CAUSE

This class was one in a series of 11 conducted in 2009 by the Wildlife Commission in various locations across the state. It was part of an annual in-service training for wildlife officers, who are instructed and certified in detection and apprehension of impaired operators during their academy training. The courses are both state and nationally certified by the N.C. Forensic Testing for Alcohol Branch and the National Association of State Boating Law Administrators. The goal is to increase deterrence of BUI violations and thereby reduce the number of accidents, deaths and injuries caused by impaired operators.

Lt. Todd Radabaugh of the Wildlife Commission is North Carolina's lead instructor for boating sobriety testing and impaired operator apprehension. He and four other wildlife instructors conducted the 11 classes, with assistance from district attorney officials, the N.C. Forensic Testing for Alcohol Branch and the Division of Alcohol Law Enforcement. Although a majority of the students observing were wildlife enforcement officers, other law enforcement officials also participated.

"There are several factors that differentiate sobriety testing on water from that on land," Lt. Radabaugh says. "Obviously, some vessels aren't designed for the operator to stand up in, like johnboats for example, and there's no walking a straight line until you are back on shore. So tests that work fine on land can prove problematic on water."

Another factor separating drinking while boating from circumstances on land is a condition known as boater fatigue. Wind and waves, combined with heat, glare, noise and vibrations, can magnify the effects of alcohol up to three times.

A landmark study by Johns Hopkins University published in the *Journal of the American Medical Association* in December 2001 looked at recreational boating deaths of people 18 years or older from 1990 to 1998 in Maryland and North Carolina. The North Carolina portion of the study was conducted in cooperation with the University of North Carolina and the Wildlife Commission. The study concluded that "alcohol use while boating affects the probability not only of ending up in the water but also of survival once that happens." The study goes on to state that "alcohol use may actually be more hazardous

on a boat than in other settings," with even low levels of blood alcohol concentration greatly increasing relative risk.

"Being inebriated is more hazardous on water than it is on land," Lt. Radabaugh says. "Over 20 percent of boating-related fatalities are alcohol related. It is not worth taking the risk while operating a boat—any boat—anywhere."

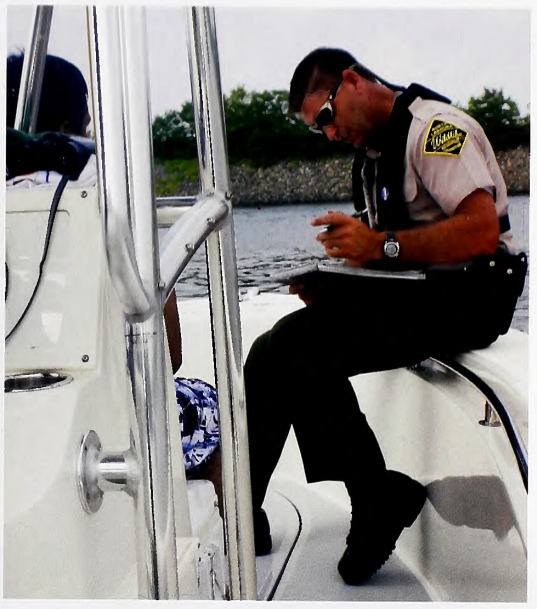
LOOKING OUT FOR YOU

The aim of boating enforcement is always safety. Wildlife officers conduct vessel safety inspections and set up random checkpoints, alert to possibly intoxicated operators, and offer safe boating education and outreach efforts. This is precisely why they regularly undergo refresher training sessions such as the BUI detection and prevention course.

Certified field sobriety tests are nationally recognized and admissible in court, and officers are trained in these techniques and qualified to use them while on patrol. The BUI classes gave officers a chance to perform these sobriety tests in a controlled setting with live subjects (the volunteers at the class party) who had achieved a predetermined blood alcohol concentration level. (Their degree of inebriation ranged from mild to wild.) The officers were evaluated during a field sobriety testing phase and had to document the results of the tests conducted. The results of the sobriety tests were reviewed in class the following morning, and only then were officers informed of the actual blood alcohol concentration levels of each subject from throughout the session.

Capt. Mitch Kuykendall, the training director for the Wildlife Commission's Division of Enforcement, says that as a result of the alcohol detection training, officers become better able to recognize and interpret evidence of BUI violations, conduct standardized field sobriety tests, and organize and present evidence and testimony in court. "A person who cannot safely operate a boat is a danger to himself and others, no matter their blood alcohol level," Capt. Kuykendall says. "This training helps keep North Carolina waterways safe and just reinforces our message: Always boat safe, boat sober."

Geoff Cantrell is a public information officer with the N.C. Wildlife Resources Commission.



Certified field sobriety tests are nationally recognized and admissible in court, and officers are trained in these techniques and qualified to use them while on patrol.

WRITTEN BY JASON F. HAWKINS

A CLASSROOM WITHOUT WALLS

ILLUSTRATED BY JOE MAHLER

EXPANDING HIS STUDENTS' HORIZONS BY MOVING THEM BEYOND THE BARRIERS OF A SCHOOL'S WALLS, THIS TEACHER MAKES THE SUBJECTS OF HIS CLASSES UNDENIABLY MORE REAL.

For most teachers, an apple on the desk is a welcome gesture. However, for kindergarten teacher Jamie Barnhill, deer droppings do just fine.

Barnhill, who teaches at Forest View Elementary School in Durham, is not your typical kindergarten teacher. He is at the same time both teacher and outdoorsman who is breaking the mold of teachers and redefining what is taught in public schools.

Public education today is not like the public education of decades ago. The teacher of today spends less time with students and more time with fragile parents and school administrators, while attempting to navigate life on a teacher's salary.

In Barnhill's class, students come first. Respect and science and conservation and life are the ABCs of learning. Step into Barnhill's classroom, and you'll see that the outdoors is the foundation by which learning occurs.

"The outdoors is my passion," Barnhill says while standing beneath a shoulder-mounted 8-point buck that hangs in his classroom. That's right, in his classroom. Forest View is a public school nestled in the shadows of Duke University and the University of North Carolina at Chapel Hill. His class is a sampling of life. There are kids from single-parent homes, low-income homes, traditional families, multicultural backgrounds and parents who may or may not have had exposure to the outdoors.

"Most of the kids in my class have never been into the outdoors. They don't know what a deer is, when it is born, or how a turkey sounds, or how to tell the difference between this kind of snake and that one," says Barnhill.

A native of Durham, Barnhill attended Northern High School and then went to college at the University of North Carolina at Wilmington. "I wanted to be a cop, but I didn't have the guts. Then it was an attorney, but I didn't have the desire," he says. "I coached at the YMCA for five years and then decided that kids would be my work." Barnhill's wife, Carol, is a preschool teacher, and they have two children, Colby and Shelby.

Asked why he became a kindergarten teacher, Barnhill says, "I can relate to 5- and 6-year-old kids. I am the biggest 5-year-old of them all. I can be silly like them, and I also know they are sponges. They absorb anything you give them. What I find is that the outdoors is well received, and they learn from this."

Keeping it real

When I visited his class a month before the end of the school year, Barnhill had his kids separated at five learning stations. The stations included wild turkey sounds, art, counting antlers, the diet of wild turkeys, and a station about butterflies, caterpillars and other insects. The classroom is

IN BARNHILL'S CLASS, STUDENTS COME FIRST. RESPECT AND SCIENCE AND CONSERVATION AND LIFE ARE THE ABCS OF LEARNING. STEP INTO BARNHILL'S CLASSROOM, AND YOU'LL SEE THAT THE OUTDOORS IS THE FOUNDATION BY WHICH LEARNING OCCURS.

filled with artifacts, collectibles, track imprints, feathers, skulls, antlers, fur and other objects found in the outdoors.

In the classroom, Barnhill serves as the lecturer and instructor, relating what he has seen while outdoors hunting or fishing. However, his lessons don't involve just those two activities. Behind his messages about the outdoors, Barnhill instills conservation and agriculture into the students' young minds.

He befriended a local farmer, Mark Waller, and the kids from his class frequently take to the farm, where they participate in strawberry picking, walking deer trails, analyzing droppings and tracks from the animals on the farm and, more important, learning about the cycle of life.

"My daughter is now in the sixth grade, and she had Jamie as her kindergarten teacher," says Durham resident Susan Shaw. "Recently, her class had career day, and they went to a farm to pick strawberries. All of the other kids in the class were afraid to pick them. But she, because of Jamie's early exposure to the outdoors and to a farm, knew what to do. That's just one of the lessons that Jamie taught her, and that she continues to learn from."

Above and beyond

Barnhill says his kids are somewhat like lumps of clay. He feels that the outdoors makes the perfect mold for kids. "There are too many bureaucrats who don't know what it's like to teach and be in a classroom," says Barnhill of the struggles today's teachers face. "There is no money for salaries and programs that are needed to teach. I spend more than 60 hours a week, often including Sundays, in the class planning for the next idea that I want my kids to learn."

He was recognized in 2004 as a Teacher of the Year finalist in the Durham Public Schools, and in 2005 Barnhill won the Jaycees Young Educator of the Year award, representing Durham. The accolades Barnhill has received and his popularity among former students are palpable. Leigh Furman, whose daughter, Abby, was in Barnhill's class, says, "Jamie Barnhill instills confidence in these kids. He is so great with them, and he brings the outdoors and nature into the classroom, teaching them more than just the kindergarten alphabet."

Furman's husband, Jeff, grew up hunting. He knows the values and intangibles learned from the outdoors. He and his wife agree that this kindergarten teacher brings the outdoors to life in his classroom in a different way. "He [Barnhill] is awesome," says Leigh Furman. "We do spend a lot of time outdoors, our kids are exposed, but when they hear it through Jamie and it is reinforced through us, it just validates the whole concept that the outdoors is a wonderful place to learn from."

The correct path

Though Barnhill has hunted and fished since the age of 4, he wasn't sure what curriculum he would bring into the class. He believes, however, that if you are passionate about something, as a teacher in his case, then kids will pick up on it. "The first and second year that I was a teacher, a lot of the kids didn't know what hands-on science was," Barnhill says. "I brought a set of deer antlers into the class, and the kids told their parents, and surprisingly the parents were excited."

His classroom props eventually grew from the set of antlers to include many items. There are posters of hunters and pictures of Barnhill as he sits with his son, Cole, by a deer they harvested. There is a largemouth bass, caught by Barnhill, on the wall, and pictures, posters and artwork hang throughout the room. But although the four walls are decorated with displays commonly found in a local sport shop, it is what he teaches beyond the class that is most important.

At the end of the year, Barnhill and fellow teachers organized a field trip into the woods that coincided with Earth Week. Here Barnhill stood in a creek at the bottom of a 30-foot hill. The temperature was 90 degrees, and spiders, ticks and other insects were foraging about. Earlier that morning, Barnhill had placed a raccoon tail on a log, a few antlers scattered on the ground, a turkey feather in the leaves, a snakeskin draped over a stump and a turtle shell by a creek. His lesson plan that day was for the kids at Forest View Elementary to find what nature leaves behind.

For several hours, groups of students filtered slowly down the hill to where Jamie stood. He asked them to look around and find things that belong in the outdoors. Jamie instructed the kids to get close to the ground and creek and to look for sign. "Whoa, look at that!" yelled a student upon finding the snakeskin. "Is that real?" a young fourth-grader asked upon picking up the right side of an antler. "Look, a turtle shell!" called another upon stepping across the creek. It was a moment of wonder and amazement and truth for these kids. Some had been in Barnhill's class and were familiar with the sign they found. Others had never been into the woods, by a creek or down a hill and looked for feathers in the leaves.

Barnhill calmly spoke to the kids, answered questions and entertained their minds. He was in his place, his classroom. He talked of why rat snakes are important and asked the kids to identify the raccoon tail on the ground. Barnhill discussed the set of antlers, and the parent who brought them to his class and mentioned that the deer had been hit by a car. He used the opportunity to explain the benefits of hunting and why hunters have a role in conservation, as natural predators for deer do not exist in this area.

A young girl among the students raised her hand and was soon called on by Barnhill. "Um, yes, hunters are important because they help to keep the deer population down. If it wasn't for hunters, there would be too many deer, and they would have problems, and we would hit them with our cars. I don't like seeing deer hit by cars."

"Can you stay here all day and repeat that and tell the world?" Barnhill asked the girl. She grinned bashfully and soon retreated up the hill with the rest of the class.

Barnhill finds it astonishing that kids today are reared in environments where the outdoors is never thought of as a resource to learn and grow by. He says, "Hunting taught me how to see and take it all in. You often hear hunters say that they sit in the dark, early in the morning, to wait for the woods to come alive. Well, you know, it really does, if you learn how to listen and sit and enjoy."

Barnhill explains how his teaching of the outdoors, and specifically parts of the curriculum where hunting is the topic, is received by parents who do not hunt or do not want their kids to learn about hunting: "Ninety-nine percent of the parents whom I talk to about my classroom and what I teach are supportive and understanding of the ideas that the outdoors is this wonderful classroom and that I believe hunting is a part of the outdoors," he said. "But occasionally I'll have a parent who expresses concern that their child might hear about my hunting or be exposed to hunting. I listen to them, and I explain that I present the outdoors as a life cycle, and that for some game, that life cycle involves hunting. It really amazes me when parents say, 'My kid is going to be affected by this' when hunting is the topic. What I often say is that if the outdoors and hunting are true concerns, then what other parts of life would you be afraid to talk to kids about? I explain everything with a scientific and conservation background. I don't focus on the aspect of killing game—that's not my place."

BY TEACHING ABOUT
GAME AND FISH, AND THE CYCLE OF THE SEASONS, AND
BUGS AND SNAKES, AND COUNTING POINTS ON A DEER'S ANTLERS,
HE IS TEACHING LIFE.

Thinking outside the box

The idea of teaching the outdoors in a public school is, unfortunately, a sensitive one for most teachers. But Barnhill seems to identify with the delicate nature of teaching about the positive attributes of hunting and also instructing on the nature of animals that are not hunted. His concept and curriculum strike a comfortable balance with his kids.

When asked about the idea of the outdoors in the classroom, Barnhill said he believes it is all about being new. "I think the outdoors that I teach to the kids is a combination of novel idea and kids learning from something they have never heard of before. When the kids walk in and see the deer and antlers and hide and fish, and the track prints and artwork and posters and all that I have in the class, it amazes them. In essence, these kids learn a foundation in education from what I know about the outdoors. I incorporate language and math and science and word recognition into the outdoors, and they thrive from this."

In the right place

When asked about the future, Barnhill explains that he is in the best place for him right now. "I don't want to leave the classroom. I feel like I am carrying the torch for those who are passionate about hunting and fishing. Though I am not encouraging kids to hunt and fish, I am informing them that the outdoors is a choice, a good choice for parents and kids to make together."

Barnhill has many ideas and thoughts about where his classroom will go in the future. He is constantly relating the foundation of education

and what kindergartners need to learn to the outdoors. Barnhill has an immediate goal of extending his classroom beyond the walls at Forest View Elementary into the outdoors, literally. "I have permission from a landowner nearby to build an elevated blind on their land. What I want is to be able to bring the kids from the classroom into the outdoors and to let them watch deer and turkey and other game. This would be a place where we can apply what we know about animals and nature, and instead of talking about it, we can watch and reinforce that this really happens."

Jamie Barnhill doesn't believe that he is a better teacher than those around him. What he believes is that his commitments to the outdoors and to education are synonymous. By teaching about game and fish, and the cycle of the seasons, and bugs and snakes, and counting points on a deer's antlers, he is teaching life. The lumps of clay that pass through his doorway each year are eager to learn. The thirst for something new is always present in the mind of a child.

"I'll never be rich from this job," says Barnhill. "But the richness I get from seeing kids learn about the outdoors and watching how it molds them for the future, that's priceless."

The outdoors is a place from which we all can learn. The outdoors is a place that humbles and instructs and nourishes and develops us. In this public school setting, where passion and pursuit and science and conservation are melded together so effectively, foundations are laid and opportunity awakens in these young minds. These are all things that hunters and conservationists have known for years. Barnhill knows that his classroom is comprised of diversity and young minds ready and eager to learn. Though they meet within the confines of the four walls of a school's classroom, they learn in a classroom without walls. ◆

Jason Hawkins is a freelance writer from Hillsborough. He contributes a weekly outdoors column to the Durham Herald-Sun.

Unlike land plants, amazing aquatic plants love being in the water.

Come on in ...

The Water's Fine!

written and illustrated by Helen Correll / nature activity by Anne M. Runyon

Have you ever forgotten to water a potted plant? You know what happens . . . it droops, wilts and finally dies. Plants need water to support cell walls, deliver nutrients and help in photosynthesis. Have you ever overwatered a plant? That plant is no better off than the dry one because plants also need oxygen. An overwatered plant drowns because it cannot "breathe." It is not adapted to living in water.

Aquatic plants have special roots able to take oxygen from water. Four sets of adaptations allow them to thrive in their watery world. Some aquatic plants have specialized roots and feathery leaves. Others have pores that open and close, or leaves with air ducts floating on top of the water. Some have flexible leaves that move with flowing water. Aquatic plants are true to their name: Water is home and they can live nowhere else.

ANKLE DEEP

Along the edges of ponds, slow creeks or canals grow plants with their root systems in the shallows while their stems, leaves and flowers stand tall and strong above the water surface. These are *emergent* plants. Emergents have channels in their stiff stems that deliver air from leaves to roots. Cattails, rushes and sedges are well known emergents found throughout North Carolina.

Cordgrass is an emergent plant that lives in salt marshes and is flooded by high tides twice a day. It has developed special membranes that filter out salts during high tide, allowing only water to enter. If a little salt does sneak into the plant, it is stored in special compartments in the cells and later squeezed out through glands in the leaves.

Oxygen enters through tiny pores in the salt glands and passes on to the roots through a system of tubes. The pores close when the plant is submerged at high tide.

Emergent plants are important to many species of insects and birds that nest in their branches and eat the fruit, and to mammals that eat the leaves and are protected by the cover.

FLOATERS WITH ONE FOOT ON THE GROUND

Floating-leaf aquatic plants are showy plants such as water lilies, American lotus and spatterdock. Their roots grow from thick rhizomes anchored in the bottom mud and their long rubbery stems are full of air pockets. Topping the stems are wide, flat floating leaves and large flowers. Floating-leaf plants breathe through *stomata*, tiny pores located on top of the floating leaves, that let air pass into the plant and down "air-tubes" in the stem, to the roots. A heavy coat of waxy *cuticle* keeps the stomata free of dust and repels rainwater that washes the leaves clean.

FREE FLOATERS

True floating plants move freely on the water's surface and have small roots hanging in the water below them. The smallest floating aquatic plant is duckweed. These tiny plants don't have typical leaves; they look like miniature pool rafts filled with air to keep them afloat. Two stomata are located on the topside of each plant. In warm weather, duckweeds grow into thick colonies that look like a bright-green carpet on the surface of a swamp or pond. When the weather gets cold, the plant produces a bud, or *turion*, that grows heavy with a winter's supply of starchy food. The whole plant sinks slowly to the bottom of the pond. When warm weather returns, the turion produces a tiny gas bubble that carries the plant back to the surface.

Bladderwort is a free-floating carnivorous plant with no roots at all. During summer, bladderwort displays dainty three-lobed yellow flowers above the water, while its leaves float just under the surface. The leaves have small bladders that trap tiny aquatic organisms by sucking them in and then digesting them.

Floating plants are eaten by many dabbling ducks that "graze" on the water's surface. Underwater portions of floaters are home for tiny invertebrates, which in turn are food for many fish, frogs and ducks.

Frogs hunt insects from atop floating leaves, while largemouth bass and bluegills enjoy the shade they provide. Deer, beavers, muskrats and other rodents eat the leaves and rhizomes of water lilies; ducks eat the seeds.

H.S. Correll

UNDERWATER SWIMMERS

Submersed aquatic plants are rooted in the mud and grow most of their leaves completely underwater. Their flexible stems are supported by the water and have air sacs that allow them to float, and feathery leaves collect carbon dioxide and oxygen directly from tiny bubbles in the water. Bushy pondweed is a typical submersed plant, growing in dense patches underwater. Fanwort grows "fan-shaped" leaves underwater, topped with a few small floating leaves to help support the flower when it blooms.

Submersed plants release oxygen into the water and are home for micro and macro invertebrates, small fish, and frogs that in turn are dinner for herons and egrets.

Invertebrates are very small animals without backbones, such as insect larvae or worms. Some can be seen only through a microscope (micro), while some are large enough to be seen with the naked eye (macro).

THE BULLIES

Just as in the world of land plants, non-native aquatic plants are unwelcome visitors. Hydrilla, introduced from Asia, appeared in Florida in 1960. Since then it has spread rapidly up the Atlantic Coast as far north as Maryland and Delaware. Water hyacinth and water lettuce are invasive plants from South America still occasionally sold by some garden shops. Invasive plants displace native aquatic plants and clog water flow and human movement in waterways. They block light and reduce oxygen levels in the water, hurting fish as well as water quality.

WATER HYACINTH

Read and Find Out

- "I Wonder Why Trees Have Leaves: And Other Questions about Plants" by Andrew Charman, Houghton Mifflin, 2003.
- "Plants in Different Habitats" by Bobbie Kalman and Rebecca Sjonger, Crabtree Publishing, 2006.
- "Salamander Rain: A Lake and Pond Journal" by Kristin Joy Pratt-Serafini, Dawn Publications, 2001.
- "Through the Looking Glass: A Field Guide to Aquatic Plants" by Susan Borman, Robert Korth, Jo Temte and Carol Watkins, University of Wisconsin Press, 1997.

In *Wildlife in North Carolina:*

- "The Cattail's Savory Success" by Lawrence S. Earley, February 1998.
- "Can We Build a Wetland?" by Lawrence S. Earley, July 1994.
- "Wetlands Aren't Wastelands" by Lawrence S. Earley, July 1987.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

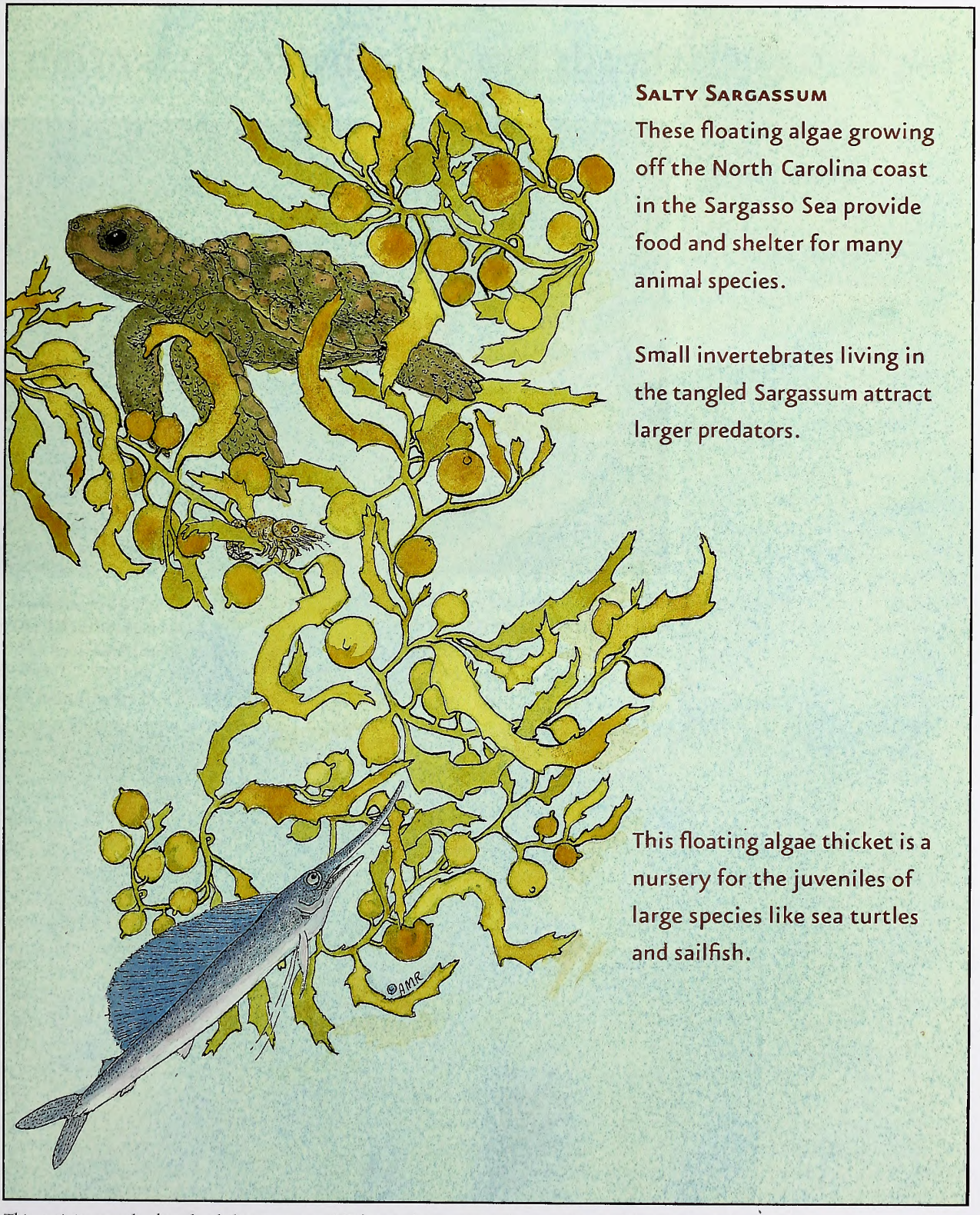
Get Outside

You can find aquatic plants in your closest lake, pond or slow-moving stream. With your family, visit one and see how many aquatic plants you can find. Take a notebook or journal and on one page draw a big "plus sign," dividing the page into four parts. Write one of the four categories of aquatic plants in each square: Submersed, Free Floating, Floating Leaves and Emergent. For each plant you see, decide which box it fits into and write its name, or draw its picture there. An adult can use a long stick to reach for submersed plants. Make a page for each body of water you visit.

Make a Salty Sargassum Free-Floater Bookmark

Torn from rocks along the Atlantic shores, clumps of brown algae drift with the ocean currents into the Sargasso Sea. Here these travelers, called Sargassum, thrive as free-floating plants, far from shore in the open sea.

Cut out the picture and fold in half lengthwise. Glue shut to make a bookmark.



This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

White Oak Flatheads Draw Biologists' Attention

After collecting two flathead catfish from the White Oak River during a routine sampling trip in April, biologists with the N.C. Wildlife Resources Commission are reminding the public that introducing fish to public waters where they are not native can have irreparable ecological consequences.

Biologists have been sampling the White Oak River since 2001, and this is the first time they have found flatheads in the blackwater river, which flows along the Jones, Onslow and Carteret county line in southeastern North Carolina.

The discovery is alarming because flatheads are big fish with big appetites, feeding primarily on live fish. Research has shown that their feeding habits can lead to the decline of native fish in waters where they have been introduced.

NCWRC

Fisheries biologist Bob Barwick holds a 32-pound flathead catfish taken from the Tar River near Greenville.

Flatheads, which are native to the Mississippi River basin, have been introduced into rivers in the eastern part of the state, becoming well established and abundant within 10 years of being introduced into the Cape Fear, Tar and Neuse rivers, as well as Sutton Lake in New Hanover County.

Since 2006, commission biologists have been conducting surveys in the Tar River to document changes in the catfish community as flatheads become established in the system.

"We've seen big changes in the numbers of flathead and white catfish," said Bob Barwick, a fisheries biologist with the commission. "In 2006, white catfish made up over half of the catfish population in the Tar River, but now they only comprise about 30 percent of total catfish numbers."

Conversely, in the 2006 survey, flatheads accounted for 14 percent of the catfish population in the Tar River. In the most recent survey, conducted in 2008, they comprised 56 percent of the total catfish numbers.

"From diet studies, we know that other catfish are commonly eaten by flathead catfish, and the initial trend in the Tar River indicates that white catfish have declined as flatheads have become established," Barwick said. "We suspect that changes in abundance are due to flathead consumption of white catfish."

Barwick said they will continue annual surveys to identify fisheries impacts on catfish, largemouth bass, sunfish and other game fish.

In addition to white catfish, flathead catfish are known to eat other popular game fishes, such as largemouth bass, sunfish, crappies, perch and shad, and can have undesirable effects on these populations.

Anglers fishing the Lumber River, a river once known for excellent redbreast sunfish fishing, reported declining catches of redbreast sunfish in the early 1990s, and subsequent commission surveys confirmed that the abundance of redbreast sunfish in Lumber River samples had declined by 35 percent. Declines in white catfish, snail bullheads and flat bullheads were also observed.

Flathead introductions into the White Oak River and other eastern North Carolina rivers are most likely due to unauthorized stockings by well-intentioned anglers who wanted to improve fishing opportunities or establish a trophy flathead fishery.

However, once a fish is introduced and becomes established, there is always some ecological impact, usually negative, although that impact may take years to determine.

Because unauthorized stockings can have unforeseen consequences, the commission passed a regulation in 2005 that required anyone interested in stocking public, inland water to obtain a stocking permit. The requirement protects native and established aquatic species from the potentially damaging effects of unauthorized stockings by allowing the commission to assess the impacts of a proposed stocking on a case-by-case basis.

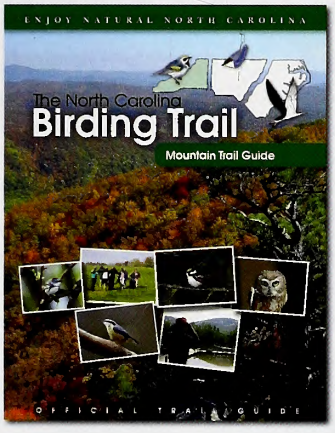
"Anglers who catch a flathead catfish from the White Oak River can harvest the fish or release it back into the water from which it was caught," Barwick said.

Mountain Birding Trail Complete

The N.C. Wildlife Resources Commission is celebrating the completion of the third and final segment of the N.C. Birding Trail, which links birding sites from the coast to the mountains across the state.

The Mountain region of the trail features 105 sites west of Interstate 77, including Chimney Rock State Park, Latta Plantation, Whiteside Mountain and Craggy Gardens. Birdwatchers might see peregrine falcons, yellow-billed cuckoos, sparrows of various types and dozens of species of warblers that make the region critical for bird conservation.

Birders, researchers and supporters of the trail celebrated its completion during an event at the N.C. Arboretum in Asheville. The event culminated with the unveiling of the "North Carolina Birding Trail—Mountain Trail Guide," a full-color book including site descriptions, maps and directions to the sites, lists of likely birds, and lists of other cultural and natural resource sites that trail users can visit as they travel along the trail.



"Today's event marks a milestone both for the region, and for the birding trail as a whole," said Chris McGrath, a Wildlife Diversity Program Coordinator with the commission. "With 310 identified sites, North Carolina birders and visiting birders from around the world have the opportunity to plan and visit sites from the Outer Banks to Murphy. The complete birding trail guide series can help them identify incredible locations to visit and experience some of the more than 400 bird species that occur in North Carolina."

North Carolina has long been known for its remarkable birding opportunities. The N.C. Birding Trail is composed of federal, state, local government and private lands, linked along drivable routes to help market and encourage nature-based tourism to promote wildlife conservation and also help local economies that depend upon those natural resources.

The commission, along with the U.S. Fish and Wildlife Service, the N.C. Cooperative Extension Service, N.C. Sea Grant, Audubon NC, the N.C. Division of Parks and Recreation, and dozens of other partners including The Progress Energy Foundation, The Carolina Bird Club, The Cardinal Foundation, and the Nongame and Endangered Wildlife Fund have worked cooperatively to develop the Mountain Trail Guide.

The Piedmont segment of the trail was completed last year, and the Coastal Plain region was completed two years ago.

Oyster Shell Recycling Comes West

Raleigh-area residents have 12 new places to dump their used oyster shells and help the environment at the same time. Wake County Solid Waste and the N.C. Division of Marine Fisheries created oyster shell recycling drop-off areas at all 11 county waste convenience centers and the county's landfill in Apex.

The drop-off centers will be the most recent additions to a growing number of spots in North Carolina where the public can help reduce the landfill waste flow and restore oyster reefs by recycling oyster shells. People can recycle other calcium-based shells such as clams or mussels, too.

Wake County restaurants produce the highest volume of shells of any county in the state. In 2008, the program collected more than 5,000 bushels of shells from four Wake County oyster bars participating in a pilot project that ended in November 2008.

This project will provide a way for these restaurants to rejoin the recycling efforts, and allow other businesses and the public to drop off their discarded shells. Wake County will maintain its 12 sites, collect the shells and stockpile them for collection.

Oyster shells collected through the program are placed back in North Carolina coastal waters to provide a place for immature oysters, called spat, to attach and grow.

Bay Scallop Status Improves; Spotted Seatrout Decline

The stock status of four species improved in this year's North Carolina Stock Status Report of Important Coastal Fisheries, while three important finfish species declined.

Spotted seatrout, king mackerel and croaker all dropped from "viable" to "concern." North Carolina's first stock assessment for spotted seatrout, released in January, determined that the stock is overfished for the assessment years of 1991 to 2006. The stock assessment is being updated to include 2007 and 2008 data. The N.C. Division of Marine Fisheries is considering whether to recommend that the state adopt interim regulations while a Spotted Seatrout Fishery Management Plan is being developed.

While the most recent stock assessments for South Atlantic king mackerel and Atlantic croaker show the species are not overfished, there is concern about heavy fishing pressure on king mackerel and a drop in commercial landings of croaker.

The most notable change among the improved species was bay scallops, which moved from "depleted" to "recovering." The commercial bay scallop season opened in Core and Pamlico sounds in 2009 for the first time since 2006. The state had closed the fishery due to poor harvests in 2004 and 2005. Stocks had never fully recovered from a red tide event in 1987 and several hurricanes in the 1990s, and were unable to sustain fishing pressure and predation from cownose rays.

Summer flounder and monkfish moved from the "concern" category to the "recovering" category, and scup moved from "concern" to "viable." These upgrades were based on updated stock assessments that indicate the species are no longer overfished. Summer flounder, monkfish and scup all fall under federal and/or interstate fishery management plans.

The full stock status report can be found on the Division of Marine Fisheries' Web site at www.ncfisheries.net/stocks/index.html. For more information, contact DMF Biologist Supervisor Trish Murphey at (252) 808-8091 or Trish.Murphey@ncdenr.gov.

CALENDAR OF EVENTS

SATURDAY–SUNDAY, SEPTEMBER 5–6

Learn about wildlife heritage of Currituck at the fifth annual Currituck Wildlife Festival at Currituck County High School in Barco. Show features decoy carvers, wildlife painters, exhibits and decoy collections. Call (252) 453-9612.
Visit www.cometoourbeach.com.

FRIDAY–SUNDAY, SEPTEMBER 11–20

Check out the livestock exhibits, midway rides, entertainment and the N.C. Wildlife Resources Commission's exhibit at the N.C. Mountain State Fair in Fletcher.
Visit www.mountainfair.org.

SATURDAY, SEPTEMBER 12

Learn about insects at BugFest 2009 at the N.C. Museum of Natural Sciences in Raleigh. Event features exhibits, activities and presentations on insects.
Visit www.naturalsciences.org.

SATURDAY, SEPTEMBER 19

Explore Hatteras Island's traditions and the world of working watermen during Day at the Docks in Hatteras Village. Festivities, including a chowder-cooking contest, take place from 10 a.m. to 5 p.m., followed by the blessing of the fleet.
Visit www.dayatthedocks.org.

FRIDAY–SUNDAY, SEPTEMBER 25–27

Check out the trapping and fur-handling demonstrations at the N.C. Trappers Show at the Johnston County Livestock Arena in Smithfield. Call (919) 365-4961.

SATURDAY, SEPTEMBER 26

Celebrate National Hunting and Fishing Day with the N.C. Wildlife Resources Commission. The commission's education centers have scheduled a number of events, such as fishing, archery and camp cooking.
Visit www.ncwildlife.org.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Catawba-Wateree Lakes Get Fish Attractors

Since March, biologists with the N.C. Wildlife Resources Commission, along with assistance from local fishing clubs, homeowners associations and the N.C. Wildlife Federation, have been placing additional "porcupine" fish attractors into lakes James, Rhodhiss, Hickory and Lookout Shoals to add to the nearly 400 that were placed last year to enhance fishing in these waters.

They have also worked to place more than 340 into lakes Norman, Mountain Island and Wylie. By the end of June, biologists were to have placed all 700 fish attractors that were purchased this year through a grant awarded to the commission by the Habitat Enhancement Program (HEP) in 2008.

HEP is a cooperative initiative by Duke Energy, the commission and the South Carolina Department of Natural Resources to enhance, create and protect fish and wildlife habitat along the Catawba-Wateree River basin in North and South Carolina.

The attractors are being placed in strategic locations around the lakes to refresh existing fish attractor sites, as well as create new underwater habitat for fish.

As their name implies, the fish attractors look like giant porcupine quills. PVC pipes are connected to a sphere, forming a circular structure which measures about 5 feet in diameter. Multiple attractors are placed together so that the pipes overlap to increase habitat complexity and provide cover and refuge for a variety of fishes. In time, algae and plankton colonize the attractors, providing habitat for aquatic insects and other organisms that fish feed upon. As fish concentrate on attractors, angling is enhanced.

NCWRC

Commission biologists received assistance with the placement of the fish attractors from a variety of sources, including members of the N.C. Wildlife Federation, Community of Lake James Inc., Doe Run Home Owners Association, North Carolina Bass Federation Nation and Lake Lookout Protective Association. Individuals were shown how to assemble the attractors, how to sink them and where to place them in the lake.

"The whole process worked great," said Jacob Rash, a fisheries biologist with the commission. "We provided fish attractors, discussed the number to be placed at each site, and they assembled and deployed the attractors.

"This project allows us to do work that the public can truly identify with," Rash added. "Getting the public engaged in a project can give them a real sense of involvement and ownership in the resources that we all care so much about."

IN SEASON

This month, these seasons are open in North Carolina:

Canada Goose: Sept. 1–30. (Note: West of U.S. 17 hunting hours are ½ hour before sunrise to ½ hour after sunrise, and unplugged shotguns and electronic calls are allowed.)

Crow: Through Feb. 28, 2010.

Hatchery Supported Trout Waters: Through Feb. 28, 2010.

Mourning Dove: Sept. 5–Oct. 10.

Rails, Gallinule and Moorhen: Sept. 5–Nov. 13.

Teal: Sept. 12–30 east of U.S. 17 only.

White-tailed Deer: Eastern: Bow season Sept. 12–Oct. 9; Central: Bow season Sept. 12–Nov. 6; Northwestern: Bow season Sept. 12–Nov. 13; Western: Bow season Sept. 7–Oct. 3.

Wild Boar: Sept. 7–Feb. 28, 2010, only in Cherokee, Clay, Graham, Jackson, Macon and Swain. In the other 94 counties of the state, feral hogs are not considered to be wild boars, and the commission does not regulate them.

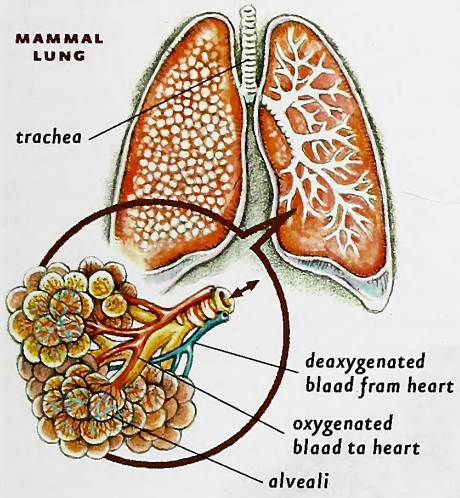
There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms during any other open season for the taking of wild animals.

Check the *2009–2010 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

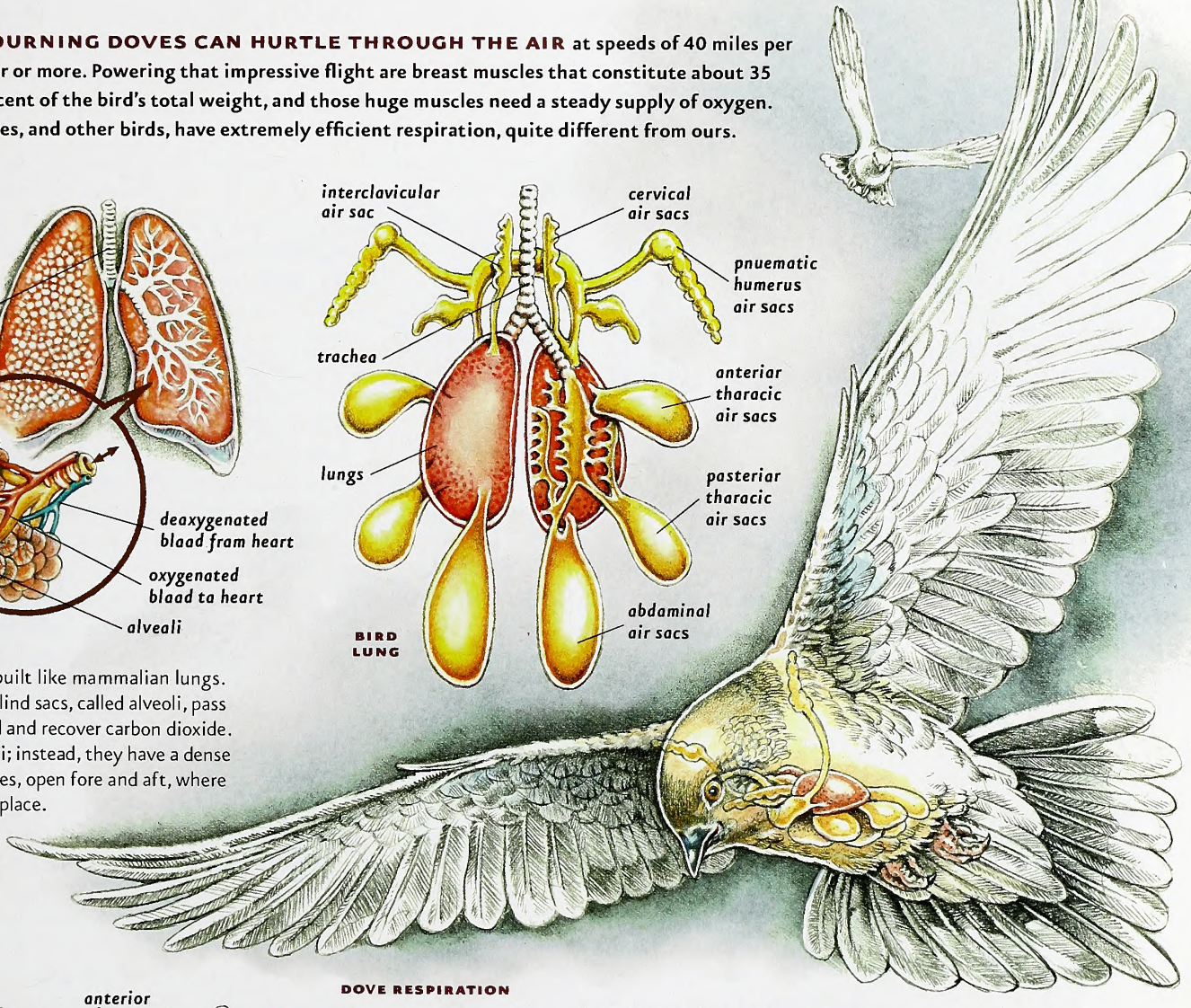
How Do Doves And Other Birds Breathe In Flight?

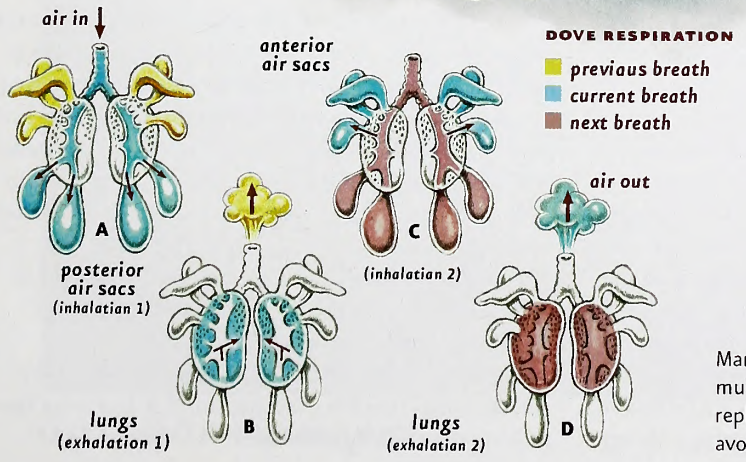
written by Clyde Sorenson
illustrated by Jim Brown

MOURNING DOVES CAN HURTLE THROUGH THE AIR at speeds of 40 miles per hour or more. Powering that impressive flight are breast muscles that constitute about 35 percent of the bird's total weight, and those huge muscles need a steady supply of oxygen. Doves, and other birds, have extremely efficient respiration, quite different from ours.



Bird lungs are not built like mammalian lungs. In mammals, tiny, blind sacs, called alveoli, pass oxygen to the blood and recover carbon dioxide. Birds have no alveoli; instead, they have a dense network of tiny tubes, open fore and aft, where gas exchange takes place.





Key to the dove's respiratory system are the air sacs located behind and in front of the lungs. When the bird first breathes in, most air flows to the posterior air sacs, though a little goes through the lungs and into the anterior sacs. When the bird exhales, the air stored in the posterior sacs surges through the lungs, oxygenating the blood. On the next inhalation, the deoxygenated air flows into anterior air sacs and then out of the body on the subsequent exhalation. The bird thus has a constant supply of oxygen-rich air flowing through its lungs.

Mammals like us, on the other hand, with our blind sac lungs, accumulate carbon dioxide in the stale air that must be vented and replaced with oxygen rich fresh air at every breath. We also can't avoid mixing the two kinds of air, further reducing efficiency.

Terrarium Trout

written by Jim Dean

The rain began as an overnight drizzle, and by midmorning heavy showers were on the march through east Tennessee and western North Carolina. The floodgates on the tail waters we had hoped to fish were wide open around the clock, and the freestone streams we checked out were high and murky. Everywhere we looked, there was water. I swore I saw an ark silhouetted on a distant hilltop with a line of animals waiting to board, but as we passed nearer, it turned out to be a string of cows heading for a barn.

JIM DEAN

We had planned to fish several more days, but where? Only the tiny headwater streams seemed likely to be clear and low enough to fish, but most of our group had little interest in fishing trickles for 6-inch trout. But what if those trout were brookies that could trace their Southern heritage to the last Ice Age?

"Once you have adjusted your rhythm and expectations to such water, all fishing is relative and rewarding."

Most of the brookies in our Appalachian streams have been routinely stocked here over the past century from brood fish collected elsewhere, principally from the Northeast. However, some biologists long suspected that the original Southern brook trout might be a genetically distinct species, even though the difference is not obvious to the eye. About 30 years ago, Wildlife Commission fisheries biologist Bill Bonner led a study that proved the Southern strain of brookie is, indeed, unique. Surviving pure-strain populations were also found in remote headwaters. These true natives have been reintroduced into tributaries above natural high falls or man-made barriers where they face no competition or bloodline corruption from other species of trout.

I knew that one of these restored streams lay in a remote valley not more than an hour away, although I had never been there. The stream was relatively easy to find, which is why I'm not going to reveal its name, or any others I know about. Besides being small, such streams are fragile and can't stand much pressure, especially from anglers who might keep fish.

I strung up my fly rod at the car, stuck a fly box in my pocket and decided to wade wet, wearing only my wading shoes. The trail followed the creek through a pasture, then dipped into a heavily wooded gorge where the creek began to change its character. Deeply shaded and staircased pools, many no bigger than bathtubs, replaced the flat pasture stretches of shallow riffles. After I had crossed the stream several times, the trail petered out, and I sat on a rock to rest and have a look around.

I have fished a lot of trout water in my life, but I don't believe I have ever been in a more beautiful place. Bright green moss covered the rocks, and wildflowers were blooming in thick profusion amidst rhododendron and laurel on the slopes. There was no poison ivy anywhere. Though it was midday and hot, the gorge was dark and cool. Though surely this place had been timbered at some time, it was not obvious. Huge poplars, hickories and hemlocks soared into a dense canopy that was penetrated only by a few misty shafts of sunlight that dappled the pools. I saw no trash, no footprints, no evidence that anyone had been there. It was like a terrarium, but one no human could ever replicate.

Brookies are notoriously easy to catch, and I caught five in the first pool I fished. I was using a barbless hook so I could release them without harm. Even so, I decided not to try to catch more than one or two in each pool. Most were only 4 or 5 inches long, and some were not much bigger than the fly. The trophy of the day was a living jewel that might have exceeded 7 inches.

Once you have adjusted your rhythm and expectations to such water, all fishing is relative and rewarding. Indeed, with so much to look at, I found myself stopping frequently just to admire a particularly handsome fern, a mossy fairyland or a salamander.

I don't know how or where you prefer to fish, but I can promise that you will not consider your time wasted on brook trout water. Since you'll be doing a lot sidearming, roll casting and bow-and-arrow flipping, a rod no longer than 7 ½ or 8 feet will help keep you out of the trees. However, I don't like rods shorter than that because it's harder to reach forward and hold the line high, keeping it out of the plunge pools. A short leader the length of the rod is also much easier to manage in tight quarters, and a 5X tippet is about right—brookies aren't leader shy. Nor are they selective. Choose a buoyant dry fly that you can see easily—a size 14 or 16 Wulff Royal or hairwing parachute Adams is all you'll ever need.

Besides, native brookies live in such handsome surroundings that I'm guessing you'll spend more time looking than fishing anyway.

HAZEL ERIKSON

OUTDOOR MOMENT

Eastern bluebird eating pokeberry

IN THE OCTOBER ISSUE

MELISSA McGAW/NCWRC

TEACHABLE TROUT

Trout in the Classroom informs children about the life cycle of trout by allowing them to raise fish at their school.

PAPER LAND

Property sold to the state by International Paper has now been put into service in the state game lands system.

NEEDED CLARITY

Own a hunting rifle but not a scope? This primer makes the features and applications of hunting optics crystal clear.

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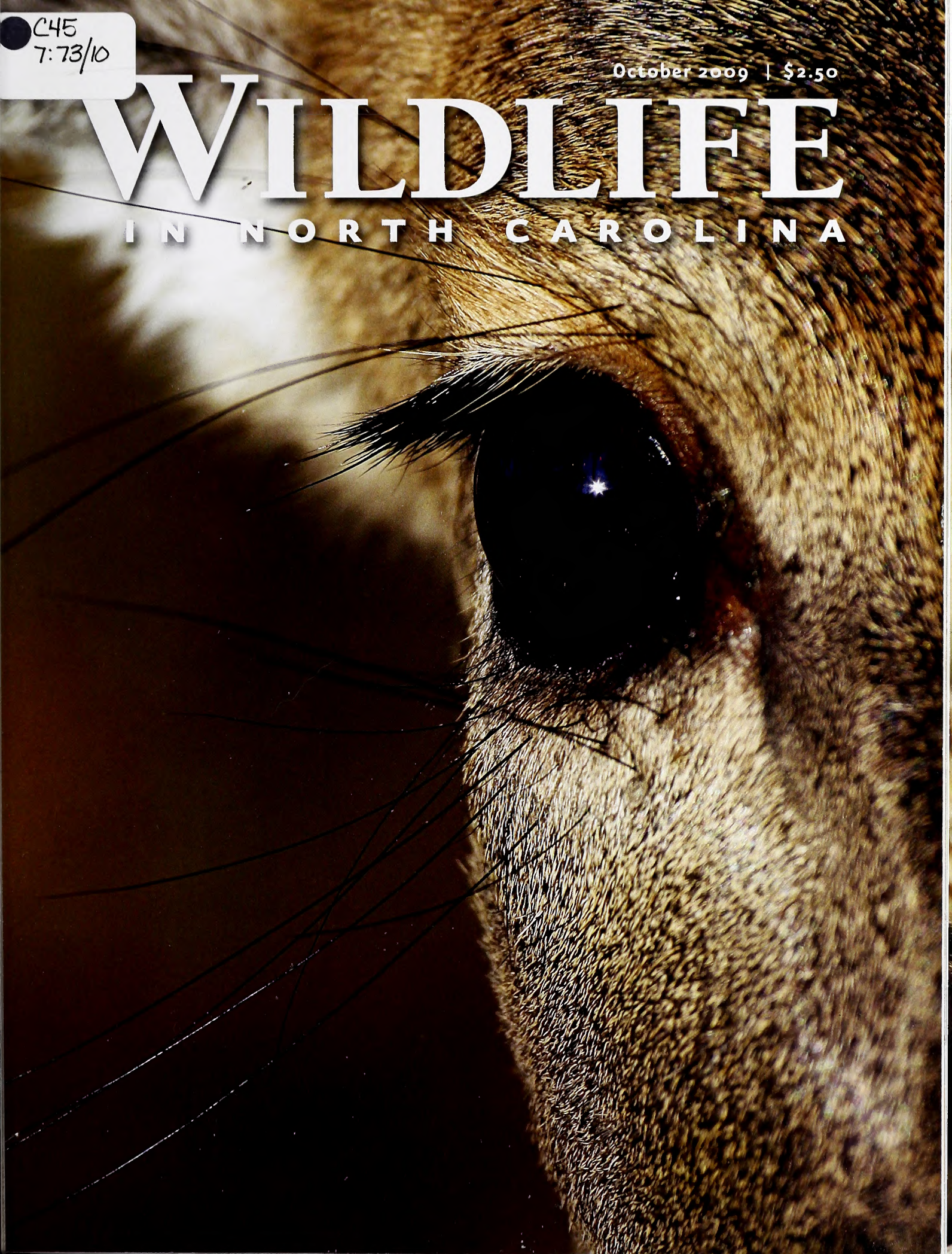

For a challenging hunt that is accessible, affordable and fun, look up in the treetops for the ubiquitous gray squirrel.
PHOTOGRAPH BY F. EUGENE HESTER.

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Cover: Both hunters and wildlife watchers crave to be near enough to a white-tailed deer to see its liquid-brown eyes up close. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

I have never understood why so many people assign the entire month of October to Halloween. Sure, All Hallow's Eve is fun, but October is much more than jack-o-lanterns, black cats and movie monsters. Those who wish away October in anticipation of the scary holiday at the end are missing one of most spectacular months of the year in North Carolina.

F. EUGENE HESTER

Anyone who has lived in the state for very long knows that we are lucky to get a taste or two of cool weather in September. October is when autumn finally happens, making it the best month of the year for camping, paddling, and many types of fishing and hunting. Someone who planned carefully could catch a mess of spots from a kayak at Cape Lookout one weekend, then camp and hike along the Blue Ridge Parkway to see the changing leaves the next.

If you bowhunt for deer, October means that you can finally hunt in comfortable weather. Before you go, make sure to check out Bruce Ingram's article "Food or Funnels?" on page 20 for tips on where to place your tree stand. If you prefer to walk the woods with a rifle on a sunny afternoon, squirrel season opens this year at the beginning of the month. In "New Rules for Familiar Game" (page 10), Gary Henry offers tips for making squirrel hunting more challenging. Going in early October, when most of the leaves are still on the trees, could increase the challenge by an order of magnitude.

For those who prefer to hunt deer with a gun, October Sundays are perfect for scouting new game lands. Associate editor Jim Wilson's piece "The Big Buy" on page 14 tells how tens of thousands of acres of forest land were added to the state game lands system and are now open to the public. Managing editor Mike Humphries contributes "A Clear View on Optics" (page 26) if you decide that you need a new scope for your rifle this deer season.

Delayed-Harvest mountain trout waters also open this month, offering anglers a great catch-and-release option. The fish raised by schoolchildren participating in the Trout in the Classroom program detailed in Geoff Cantrell's story "Hands-on Trout" (page 4) are stocked in Hatchery-Supported streams, which means you can keep a handful of them if you wish. Be sure to check creel limits at www.ncwildlife.org before you fish.

Whatever you decide to do in the great outdoors—including trick-or-treating—enjoy October. I know I will.

Greg Jenkins

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Trees Galore

I enjoyed the article on *Torreya taxifolia* in the August issue ("Rewilding a Native"). I got a small tree from Woodlanders nursery in Aiken, S.C., about 18 years ago. It did splendidly but began to decline about three years ago and died last fall. Several years ago I bought two more: One is at Greensboro County Park and the other at Green Hill Cemetery. Both are doing fine.

One of my sons who is a soil scientist was working in southwest Georgia. When I visited him in winter, we took a field trip along the Apalachicola River in Florida. The *Torreyas* we saw there at the state park did not look good. My tree looked fine in comparison, but alas, it soon began its decline. I suggest a few *Torreyas* ought to be put in various botanical gardens at Chapel Hill, Asheville, etc.

Bill Craft
Greensboro

After reading "Rewilding A Native," I checked the cover of the magazine to ensure that I was indeed reading a wildlife magazine and not some magazine devoted to a political ideology. Phrases such as "save the species from global warming's onslaught," "human-induced climate change" and "global warming is likely a factor in its current situation" demonstrate a political point of view, not fact.

The *Torreya taxifolia* has survived and evolved for hundreds of thousands of years. As the article mentioned, it migrated (a very poor choice of words) south during the last Ice Age. Did man cause the warming since that ice age 18,000 years ago? Whether or not *Torreya taxifolia* continues to survive should be left to nature. That's why we call it natural selection, and contrary to the author's assertion man is part of nature just like every other organism on earth.

Over the hundreds of millions of years that the Earth and all of its life forms have been evolving, hundreds of thousands of species (a very conservative estimate) have developed and either evolved into a new species or gone extinct. To think that man is somehow able to, or should stop this process dead in its tracks and that all evolution should stop and that all species alive today must be preserved, is ludicrous. It is surpassed only by the arrogance to believe that man can be either responsible for, or stop the earth itself from evolving and the climate from changing. In the future please have biologists write your articles, not political activists.

Martin Walker
Salisbury

Editor's note: See Back Porch in November for a follow-up on "Rewilding a Native."

Not Fond of Ponds

I look forward every month to each issue and read it from cover to cover. But I disagree with the article "A Good Problem to Have" (Aug. 2009). In our area of Nash and Edgecombe counties, the beavers do far more damage than good.

One only has to ride down U.S. 301 between Battleboro and Whitakers to see the total destruction of what was once a thriving hardwood bottomland. There isn't a single living tree left of monetary value.

If you were to poll the landowners in our area, they would be in favor, as I am, of eradicating all beavers east of Interstate 95. I know one family that has a farm they have owned for generations. Paying taxes on their land every year, they hoped to sell the timber to supplement their retirement. But the beavers moved in and flooded their bottomland almost overnight. To salvage what they could, they hired a helicopter logging crew. What should have been a timber sale worth several hundred thousand dollars barely was enough to take the family out to eat at the local steakhouse.

I would think that a living bottomland hardwood forest is more valuable than a beaver swamp. A timber sale would generate state and federal income taxes and timber for homes; the living forest would remove large amounts of nitrates and phosphates out of the environment and convert them to lumber; the living forest would convert tremendous amount of carbon dioxide to oxygen; and it would provide better habitat for deer, squirrels, raccoons, turkeys, rabbits and other animals.

Burt T. Philips
Battleboro

The Beaver Ate Them

Some of you might have noticed a few important words missing from a very prominent place in the August issue — the cover. The words "in North Carolina," which usually reside underneath "Wildlife" on the cover, were accidentally left off. Amazingly, about 15 people who work on the magazine each month — the entire *WINC* staff and the folks at PBM Graphics, our printing company — had opportunities to catch the error and did not.

Don't worry, loyal readers — we aren't going national or international, as jokingly suggested by some folks who caught the mistake. The magazine will always be dedicated to bringing you stories about wildlife, wild places and outdoor recreation in the wonderful, diverse state of North Carolina. We will take this humbling experience as a reminder that we have a responsibility to uphold the high standards of this magazine, hungry beavers or not.

write us

Letters should be sent via e-mail to **letters@ncwildlife.org** *or through regular mail to Letters,* Wildlife in North Carolina *magazine, 1712 Mail Service Center, Raleigh, NC 27699-1712. Please include your name, address and daytime phone number. Letters chosen for publication may be edited for clarity and length.*

Hands-on Trout

Sometime in 2008, Chad Starbuck, a wildlife enforcement officer with the N.C. Wildlife Resources Commission, was speaking with Liz Cronan, a fifth-grade teacher in Alexander County, when he mentioned a Trout Unlimited program that could involve every aspect of a school's curriculum and be fun for the kids.

It's an interdisciplinary program, he said, so math and science, especially environmental studies, and even history are potential aspects of study. You tailor it to fit your needs. Costs aren't prohibitive.

Cronan was interested. Starbuck said he thought there would be enough support and funding to get it for her class. The program was already established in a few other schools in North Carolina, he said.

Trout Unlimited's national program Trout in the Classroom *is educating North Carolina schoolchildren about a lot more than just fish science.*

written by Geoff Cantrell
photographed by Melissa McGaw

Dozens of conversations, lots of involvement and $1,400 later, Trout in the Classroom came to Sugar Loaf Elementary School in Taylorsville, along with the prerequisite 55-gallon aquarium, water chiller, filtration system and air pump.

"It has been really interesting," Cronan said a few days before the project culminated in early April. "We took 100 rainbow trout eggs and ended with 11 fish. But the kids learned a lot—actually, they did more than learn. They got involved. They got excited and the whole school watched their progress. I think that was the other success of the program, besides the raising and releasing of trout.

"Now I have fourth-graders coming by to ask, 'Will there be Trout in the Classroom next year?' They want to know if they will get to take part in it, too."

Trout Unlimited says this is a supplemental educational activity available to students, elementary through high school, and each program is unique. Goals are to increase student knowledge of water quality and coldwater conservation and "reconnect an increasingly urbanized population of youth to the system of streams, rivers and watersheds that sustain them." Trout Unlimited emphasizes that restocking or re-establishing trout populations is not in any way a goal of the program. Proximity to a local chapter helps, and the program gives Trout Unlimited members and other volunteers the opportunity to get involved with local schools.

While raising tiny rainbow trout fry into catchable-sized fish, students carefully monitor water conditions in the cold-water aquarium in their classroom. Here, Hunter Dagenhart checks the nitrogen level of a water sample.

JODY BUGGINS/NCWRC

Above: Kayla Childers and her classmates learn a lot as they watch as the fish grow. Near right and top two photos on opposite page: With help from teachers, state park rangers and Wildlife Commission biologists, students sample a trout stream for macroinvertebrates. Opposite page, bottom: Students stock their classroom-raised rainbow trout into a mountain stream.

It is an encompassing method of learning, with lesson plans affected by variables and undetermined outcomes. And the students have to do the math each and every time they track data and feeding charts. They are also encouraged to express themselves through artwork, poetry and stories in addition to the expected assignments and essays.

Trout in the Classroom evolved from similar existing projects that were established on the West Coast in the 1980s and sprang up on the East Coast later in the same decade. Trout Unlimited volunteers worked with the program from the early stages, and the organization dedicated a staff member to the project in 2004. It has grown nationwide and in some rather unlikely places such as Los Angeles. New Jersey, a state better known for Springsteen and urban sprawl than trout waters, has 80 projects. (And for the record, yes, there is trout fishing in the Garden State, as well as an Eastern brook trout initiative.) At this writing, North Carolina has at least 10 projects.

"What I love about it is Trout in the Classroom is so flexible," said Rochelle Gandour, the Trout Unlimited national youth education coordinator. "It provides, as they say, many teachable moments. It takes a certain kind of teacher to take it on."

It's certainly a different way to learn. With the responsibility of a living thing—in this case, literally dozens upon dozens of living things—relying upon their care, the students must closely monitor their finned dependents and quickly adjust conditions for them to develop and survive.

"The class learned very quickly to watch pH and chemical levels," Cronan said. "On our first attempt, we had a nitrate spike and lost the entire batch. All the trout were dead. So there was a cleanup and a new beginning. We've gotten to see the struggle for survival, and the kids have grown protective of their trout."

Trout, Trout, Pretty Little Trout

The trout, grown to 3 to 4 inches long, had taken to splashing when it came feeding time in the aquarium, and this excitement meant students had to be watchful not to feed too frequently or overfeed. Discipline and self-control come into play from beginning to end with this type of project. There are life-and-death challenges going on in the aquarium, just as in the outdoors.

In the rivers, creeks, streams and branches of the North Carolina mountains, depending upon which tributary you're on, most likely there are brook, rainbow and/or brown trout in the waters. Trout need water that is both cold and highly oxygenated, which the remaining forests and higher elevations of the Southern Appalachians provide. In fact, North Carolina contains more waters capable of supporting trout than any other state in the Southeast—some 4,000 miles, all in the 25 westernmost counties.

Only the brook trout is a native trout here, a tenacious Ice Age survivor needing a habitat of the purest and coldest waters found in streams of highest elevations. Locals will call it a "speckled trout" or simply a speck. The rainbow trout was introduced from Western states, and the brown trout was brought from Europe. Both were well established in the 20th century.

Also well established in the past century was Trout Unlimited, the conservation group that is a proven benefactor and protector of trout and habitat, besides being the principal partner of Trout in the Classroom. In

July, Trout Unlimited celebrated its 50th anniversary. The conservation group has 400 chapters nationally, with 12 chapters in North Carolina.

Benefactors such as Trout Unlimited are important, and the work of other conservation partners is invaluable. Trout are a highly prized game fish sought by anglers the world over, and face varying degrees of jeopardy from pollution, development, climate change and invasive species. The brook trout population in particular has given up much of its range, so much so that an initiative known as the Eastern Brook Trout Joint Venture, a partnership that includes the Wildlife Commission and Trout Unlimited, works to protect the populations remaining and restore populations lost. Increased awareness of habitat issues by the general public and gaining further support for conservation efforts can be every bit as crucial as stocking programs and riparian restoration.

Officer Starbuck, whose conversation with Cronan got things started in her class, is an avid trout fisherman and staunch conservationist himself. He said those interests helped spur him toward a career as a wildlife enforcement officer after he started out as a police officer.

"You know, while these kids are learning about conservation and wildlife through their involvement in Trout in the Classroom, a few of them may develop a greater interest and go on to become fisheries biologists, wildlife biologists or wildlife enforcement

Welcome to Your New Home, Mr. and Mrs. Trout

On a partly cloudy and breezy Friday, April 3, Trout in the Classroom became trout in the creek.

In a morning of excitement and streamside demonstrations, the aquarium-raised fish of Sugar Loaf Elementary School and Ledford High School were released into the East Prong of the Roaring River at Stone Mountain State Park. It was an ideal setting. More than 20 miles of park streams are designated trout waters at this 14,100-acre state park in Alleghany and Wilkes counties, making it a very popular spot for fishing.

"There they go!" yelled Zachary Dixon, 10, as the bucket holding the fingerlings was poured into the current. A cheer went up from the fifth-graders, many of whom followed the trout into the water by wading out in the river.

"The most surprising thing was their growth," said Casey Shell, 12. "One minute they were like this," as he held his thumb and forefinger a half-inch apart, "then the next minute they were like that," holding thumb and forefinger wider apart. "It was just crazy how they grew."

Micah Chapman, 11, exclaimed, "Finally they're free!" He thought for a moment before adding that probably the next time anybody saw the fish might be at the end of a fishing line.

The East Prong of Roaring River is classified as delayed harvest, so for about eight months of the year only catch and release by single-hook artificial lures are allowed. There are a couple of fishing piers along the river for folks with mobility impairments to use for fishing.

Kevin Hining, a fisheries biologist with the Wildlife Commission, gave separate presentations to the high school students and to the elementary school students, tailoring the message appropriately to the different age groups. A sampling of the stretch of river, thanks to a mild electroshock stun and volunteers with nets, revealed some of the other species sharing habitat with the newly released trout.

"Trout are an indicator species," Hining said, explaining how human activities in local watersheds (and sometimes beyond) affect water quality. Toxicity can increase, he said, with increased runoff caused by construction, silt or source pollution, and other factors. The health of a trout population is a good way to track changes in the environment.

Two Ledford High students, Stacey Williams, 16, and Onna Elswick, 17, reflected on the interconnectivity of trout, water and the world.

"You start to see how sensitive life forms can be," Williams said. "People have to take care of water. It takes care of us, people and wildlife."

"We saw it in the class, that you have to be responsible for the trout to survive," Elswick said. "And you see it out here, too."

The day kept a celebratory feeling, especially during lunch. Mike Johnson took time off from his Toyota dealership in Hickory to grill hamburgers and hot dogs for everyone involved in the event. The celebration continued all the way through a stream cleanup, which became a treasure hunt for trash with cheers going up from the kids for pieces of litter found and properly disposed of.

"This was a test-case year for us," said Rusty Berrier, the Trout Unlimited state coordinator for Trout in the Classroom. "So we limited the new programs to keep it manageable and work out a protocol, get our equipment checked out, and build some experience among the volunteers. That way, we could be sure that the experience was a positive one for teachers and students."

Berrier said that his ultimate goal is to have at least one Trout in the Classroom project in each school system that has a relevant connection to trout habitat. "We have been pleased so far," Berrier said, "even with some bumps in the road."

– Geoff Cantrell

officers," he said. "At the very least, I think they'll all have a greater appreciation for the outdoors. I bet they'll be better stewards of the environment, now and as adults."

I Believe That Children—and Trout—Are Our Future

Steve Hennings is the Blue Ridge Chapter's coordinator for Trout in the Classroom. The Winston-Salem-based chapter believes the potential for the program is strong. They certainly picked the right guy to head up their efforts. Hennings proved to be an enthusiastic and reliable source for the participating teachers and students.

The students at Sugar Loaf call him "the fish guy." He worked closely with the two schools sponsored by the Blue Ridge Chapter, not to mention a couple that weren't, so the nickname is well deserved. Hennings was essentially on call for anything and everything.

"They have to learn the mechanics of a rather big aquarium and keeping environmentally sensitive fish alive. This isn't something that gets cranked up and you can forget about it," Hennings said. "There's a level of involvement and commitment required to have any kind of success with this."

Cathy Berrier, an agricultural education instructor in Thomasville, has seen success with Trout in the Classroom on a different level, with teens at Ledford High School. "We have ninth- through 12th-grade students involved, and it fits great with their curriculum and a goal to 'go green' at the school," she said. "They've examined eggs under a digital microscope, conducted a stream cleanup and recorded their activities in their journaling. It has connected them to the environment on a regular basis, so much better than learning straight from a textbook would.

"For example, we have studied the anatomy and physiology of fish and monitored the tank water quality as it relates to their health and development. In the spring we hope to engage in stream habitat studies as well."

Along the way, the animal sciences class got the attention of the local newspaper and a local TV station, hosted their own Web site and provided assistance to their grade-school compatriots at Sugar Loaf.

Parents and teachers said they also have gained insight into clean water and coldwater fisheries issues through Trout in the Classroom, so more than students are learning here. Supporters said they enjoyed the experience and learned about an effective outreach tool for the conservation causes they hold so dear. "A partnership like this takes lots of help," Hennings said. "It certainly wouldn't have happened without the Wildlife Commission." It was fisheries biologists with the Division of Inland Fisheries of the Wildlife Commission who supplied

This page and opposite: Students use dip nets to search a stream for its residents, including aquatic insects (below) and native brook trout (opposite page). Below left: Program coordinator Steve Hennings works closely with students raising trout.

guidance and trout eggs and subsequently approved the area where the fingerlings would be released into the wild. This oversight is important. Trout being released into public water is much more than students gaining a hands-on educational experience.

State law requires that anyone stocking fish, mollusks or crustaceans into public, inland fishing waters first must obtain a permit issued by the Wildlife Commission. Ecological impacts of unauthorized stocked fish are rarely reversible and cost time, money and resources for mitigation. The law protects the ecosystem, since unauthorized stockings can have negative impacts such as introducing diseases and parasites. All of the trout released by the Trout in the Classroom projects were sterile.

So, what's next for the program in North Carolina?

Already a similar program, Shad in the Classroom, has been started for schools nearer to warm water in the eastern region of the state. It has the support and involvement of the Wildlife Commission and U.S. Fish and Wildlife Service, along with some guidance from the state council of Trout Unlimited. American shad, members of the herring family, are anadromous fishes, meaning they spend the majority of their adult lives at sea and migrate up coastal rivers in the spring to spawn in fresh water. At one time, coastal rivers supported thriving shad and herring fisheries. Today, those populations are dramatically declining.

Meanwhile, Trout in the Classroom is expected to expand in other counties near trout habitat and an obliging Trout Unlimited chapter. The goal is to grow the program by at least one new school per chapter every year, then maintain the projects as long-term efforts as a youth initiative.

"The Blue Ridge Chapter has already approved $2,800 in funding for two more Trout in the Classroom projects in our area for the '09–'10 school year," Hennings said. "Plus, the Rocky River Chapter of Trout Unlimited (in Mecklenburg County) just received another Trout in the Classroom request and possible funding for another project in the Charlotte area.

"In five years there's no telling how many students we will be reaching." ◆

Geoff Cantrell is a public information officer with the N.C. Wildlife Resources Commission.

RICHARD BERNABE

FOR MORE INFORMATION

Trout in the Classroom: www.troutintheclassroom.org and www.ticnc.org

Trout Unlimited: www.tu.org or call toll-free 1-800-834-2419

Regulations, species identification and programs: www.ncwildlife.org

Shad in the Classroom: Call (910) 868-5003 for Kris Smith at the John E. Pechmann Fishing Education Center in Fayetteville

Although everyone talks about going out and getting the perfect buck, the often-overlooked gray squirrel can also make for a surprisingly challenging hunt—one that is cheaper as well.

New Rules *for* Familiar Game

Hunters who are looking for a new challenge to add some spice to their hunting season should consider reverting to the past. In the early half of the 20th century, before the tremendous expansion and increases in white-tailed deer populations, small-game hunting was the most popular pastime of hunters in North America. And the most popular game species at that time in many Southeastern states was the gray squirrel.

This animal is still found in abundance in North Carolina, and access to areas to hunt it should not be a problem since it is found on most public and private lands. The variety of plants producing its primary food, hard mast (acorns, nuts, seeds) results in fairly stable populations and good hunting in most years.

WRITTEN by V. Gary Henry
PHOTOGRAPHED by F. Eugene Hester

When hunting with dogs, usually at least one hunter carries a shotgun in addition to the rifles. For a bit more of a challenge, single-shots like those carried by these young hunters can be used.

A Hunting Handicap Although some people hunt gray squirrels with shotguns, which can also be sporting, a more challenging method is using a .22-caliber rimfire rifle. Using this firearm, the hunter can add modifications to his hunting technique that provide additional challenges to the sport. With the evolution of modern firearms and accessories, most modern hunters would probably opt for a scope-sighted, semi-automatic rifle with a capacity to hold multiple rounds of ammunition. Although there is nothing wrong with this approach, an interesting tweak to the challenge would be to use a bolt-action, single-shot or clip-fed rifle with a lower ammunition capacity.

You can also add to the challenge by using open sights rather than a riflescope. Gray squirrels are awfully small targets to hit when using a firearm configured this way, and successful hunts with them can be fairly considered no small accomplishment.

Many squirrel hunters strategically place themselves in a sitting position at the base of a tree in an area that contains den and food trees, and then they shoot the animals as they come into range by resting the gun on a tree, knee or other support for steady shooting. On the other hand, stalking the animal by slowly walking through the forest and shooting at it offhand without steadying the rifle on a support can be a challenging modification (although you should always refrain from firing unless you are sure it would be an ethical shot).

Modifications to increase the challenge are almost unlimited. For example, many hunters shoot squirrels only in the head, thus reducing the size of the target and resulting in an animal that is easier to clean. However, with open sights it may be difficult to see the entire animal well enough to consistently shoot the animal in the head, and the challenge of simply hitting the animal in vital parts located in the front part of the squirrel is likely challenge enough.

Many old-time squirrel hunters reared in a rural environment considered squirrel brains a treat. However, recent evidence of disease in humans that may be related to eating animal brains has lessened the tendency to sample this delicacy.

Challenging Tactics As any squirrel hunter knows, squirrels that are aware of a hunter will hide by staying on the opposite side of the tree from the pursuer. As the hunter moves around the tree, the squirrel, in turn, continues moving to keep the tree between itself and the hunter. Hunters try various things to counteract this, such as throwing objects to the opposite side of the tree to make noises and to shake the vegetation in order to scare the squirrel around to their side of it. Some hunters have even been known to take a long piece of string or cord with them to tie to bushes on one side of the tree so they can pull it to frighten squirrels to the opposite side.

In truth, all that is necessary to be successful with hiding squirrels is a little patience. All one has to do is find a good location to see the tree in which the squirrel is hiding, sit down and wait until the squirrel moves and shows itself. The hunter needs to stay focused intently on the tree so that he detects the squirrel when it moves, because it may reveal only a small portion of its body.

Squirrels will normally move within 15 minutes after things have quieted down. This technique works even for squirrels that have entered den trees. Squirrels that do not move within that amount of time are sufficiently frightened and are unlikely to show themselves for quite a while. As a result, the hunter may as well move on. I have dubbed this technique my 15-minute rule. I tend to be impatient, so I wear a watch and faithfully follow this rule in my hunting.

On extremely unfavorable squirrel hunting days, such as windy weather, the hunter might wait a little longer for the squirrel to move.

However, squirrels are usually not very active on windy days anyway. I attribute this to the fact that the wind is putting everything in motion, and therefore it is difficult for squirrels to detect movements of predators.

If a hunter does find a few squirrels active on windy days, they tend to be very nervous. If they detect a hunter, they hide, often in a den tree, and do not move for a considerable amount of time or until the windy weather subsides. Sometimes, a hunter can have some success on these days by intensively searching trees, especially den and mast trees, to find squirrels that are lying still on limbs.

A Successful Tradition As evidence that squirrel hunting as herein described can be very successful in North Carolina, I offer the following information. I grew up in West Virginia, a state noted for its squirrel hunting and squirrel hunters. I moved to North Carolina in 1978 and have since enjoyed the best squirrel hunting of my life. This is because of more consistency in mast production where I hunt in North Carolina compared to where I hunted in West Virginia.

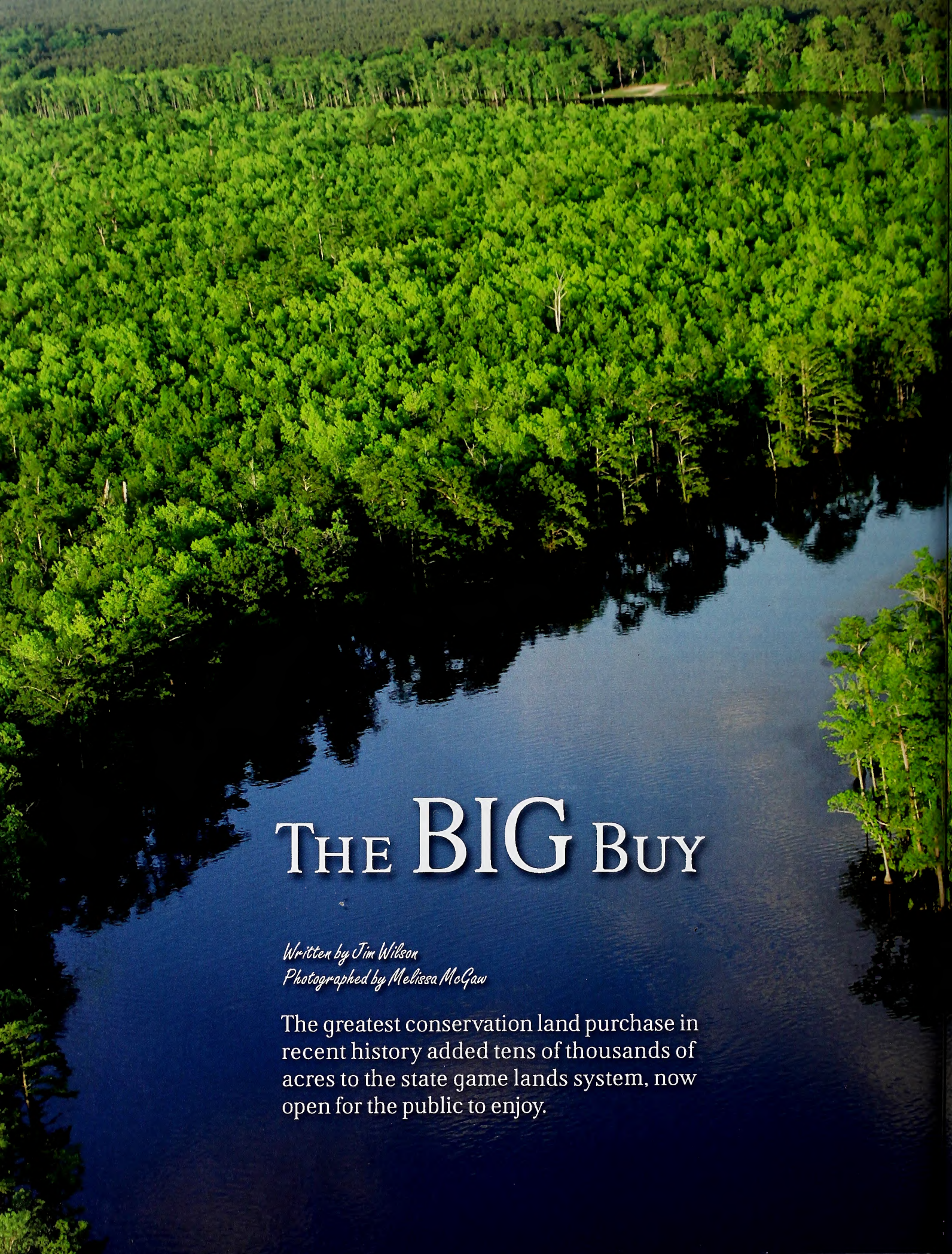
It seems that some type of mast is available every year in western North Carolina where I hunt. In my 29 years of hunting there, I have been successful in harvesting the annual bag limit (no longer in effect) of 75 squirrels in 21 of those years. This includes 13 years in a row from 1980 through 1992, and another six consecutive years from 2001 through 2006. Some of the years I failed to harvest the annual limit, probably because I hunted less. My first year in North Carolina, 1979, entailed searching for hunting areas and securing landowner permission to hunt. As a result, I ended the season four squirrels short of the annual limit.

Another throwback to the past no longer commonly seen is hunting squirrels with dogs. Usually some type of small cur dog is used. Squirrel hunting with dogs is usually a late-season technique employed when leaves are off the trees. The woods then become very open, and squirrels readily detect hunters as soon as they step into the woods. Dogs trail the squirrel by scent or sight and then bark at the base of the tree in which the squirrel is hiding. The hunter goes to the dog, locates the squirrel and shoots.

Usually two or more hunters hunt together with dogs. One of the hunters will carry a shotgun to shoot squirrels that move through the canopy, and the other hunter will carry a .22-caliber rifle to shoot squirrels holding tight.

Although many people talk about taking a trophy deer, the often-overlooked gray squirrel can offer exciting hunting that can be just as challenging—although in a very different way. It also can be a reasonably affordable way to hunt, requiring a minimum amount of gear. Get a handy .22 rifle, a few boxes of ammunition and a jacket for cool weather, and you are ready to hunt.

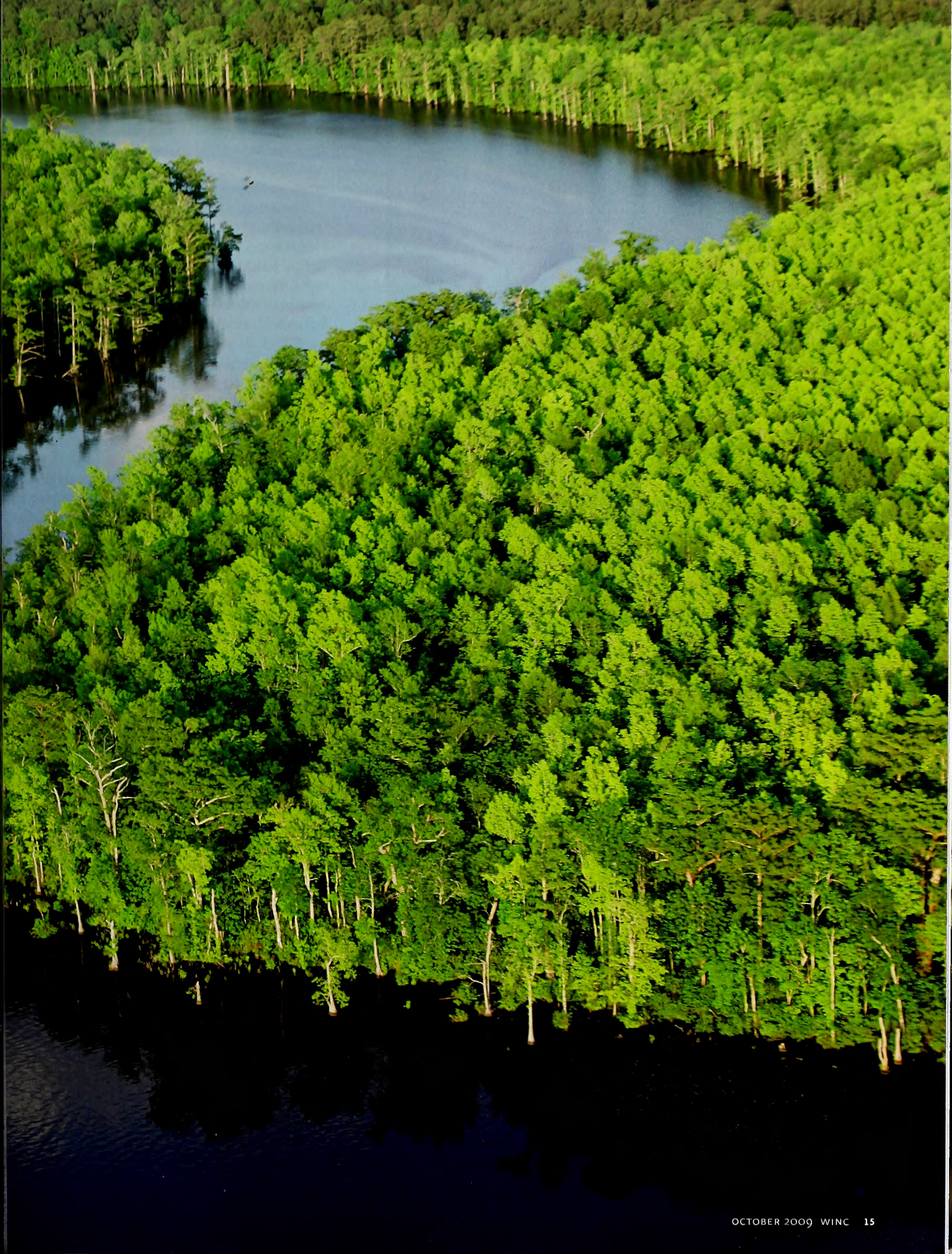
V. Gary Henry lives in Asheville. This is his first article for WINC.



THE BIG BUY

Written by Jim Wilson
Photographed by Melissa McGaw

The greatest conservation land purchase in recent history added tens of thousands of acres to the state game lands system, now open for the public to enjoy.



The International Paper land acquisition brought approximately 66,000 acres with a variety of habitats into the Wildlife Commission's Game Lands program in the Coastal Plains and Piedmont. Commission biologists such as Dale Davis (right, middle photo) must help decide how to manage the lands for game and nongame animals.

Timing, whether in wing shooting, fly-casting or land acquisition, can be everything. Take, for example, a decision made in a corporate boardroom in Tennessee a few years ago, one that set into motion events that left the N.C. Wildlife Resources Commission with 66,000 acres of new property for its game lands program.

The timing—the acquisition occurred in 2006—was at the very least fortuitous, even propitious. Had this opportunity presented itself today, in this time of pinched budgets and a ragged economy, could the commission and its conservation partners have been able to pull off the deal? Probably not. Fortunately, the deal is done and the parcels already are part of the commission's game lands, available for hunters, anglers and wildlife watchers to use. Perhaps more important, the land has been conserved for the future.

Massive Sell-Off

Briefly, International Paper Corporation (IP) of Memphis, Tenn., had determined by July of 2005 that it would make uncoated paper and consumer and industrial packaging its focuses. International Paper would shed a number of its operations unrelated to its new model, including forest products, plus most or all of its 6.8 million acres of forestland in the United States.

Most of IP's holdings in the South—4.7 million acres—were acquired by two investment groups. Another 218,000 acres that stretched from Virginia to Florida and west to Arkansas, covering 10 states, was sold to The Nature Conservancy and The Conservation Fund, which in turn sold the land to state agencies and other groups. It was the single largest private land conservation sale ever in the South. The lands in North Carolina totaled 77,090 acres, with approximately 66,000 going into game lands. The remaining 11,000 went to the Division of Parks and Recreation, the Department of Cultural Resources and private conservation buyers, including hunt clubs that agreed not to develop the land.

In North Carolina, the land acquired by the Wildlife Commission consisted of four large holdings located near or on the Roanoke, Chowan and Tar rivers, plus a section on Juniper Creek near Lake Waccamaw and the Green Swamp.

The biggest property, just over 22,000 acres, was along the lower Roanoke River in Halifax, Northampton, Bertie and Martin counties. Located near state game lands and federal wildlife refuges, the bottomland hardwood forests provide habitat for game and nongame wildlife, including more than 250 bird species.

The upper Tar River property held 20,749 acres in Franklin, Warren, Nash, Edgecombe and Halifax counties and is located near Shocco Creek Game

Land and Medoc Mountain State Park. The watershed's exceptional biodiversity includes the globally endangered Tar River spiny mussel and more than 60 species of freshwater fish.

The Juniper Creek land consisted of 18,341 acres in Columbus and Brunswick counties. This tract is valuable not only for its natural features but also because it will help connect other conservation lands—Lake Waccamaw State Park, The Nature Conservancy's Green Swamp Preserve and the commission's Columbus County Game Land. The area is one of the most biologically diverse along the Atlantic coast, providing habitat for rare animals such as the red-cockaded woodpecker and plants such as the Venus' flytrap.

The final piece, 15,464 acres along the Chowan River in Gates and Hertford counties near the Virginia line, is adjacent to Chowan Swamp Game Land. The property includes a rare scrub oak and longleaf-pine community, reminiscent of the Sandhills more than 100 miles away, and provides habitat for the endangered red-cockaded woodpecker as well as black bears, otters and migratory songbirds.

From those four IP parcels, the commission created six new game lands: Brinkleyville, Embro, Lower Fishing Creek, Sandy Creek and Tillery in the Piedmont, and Juniper Creek in the Coastal Plain. Additional acreage was added to the existing game lands of Bertie County, Chowan Swamp and Roanoke River Wetlands in the Coastal Plain, and Shocco Creek in the Piedmont.

High-Quality Additions

The acquisition of the IP land, said David Cobb, chief of the commission's Division of Wildlife Management, accomplished several things at one time for the game lands program. "The IP lands brought additional properties in high-priority areas like the Roanoke River Basin, the Tar River Basin and down around the Green Swamp. Some of those tracts were high-priority lands that fit in well with what we already had. Some of those tracts will serve as an anchor for some additional acquisitions in the future whenever we start getting money again to actually buy land.

"The purchase added acreage to the game lands system overall. Several of those areas were significant additions to lands that were already in conservation ownership that had high-priority species. It's not just the game lands and hunting and fishing and wildlife viewing, it had some conservation benefits for a lot of species."

For hunters and anglers, Juniper Creek Game Land provides abundant opportunities, from white-tailed deer, black bears and wild turkeys to waterfowl, bobwhite quail and warmwater fishing. And Juniper Creek, like many of the other IP properties, was a natural fit into the pattern of already established game lands.

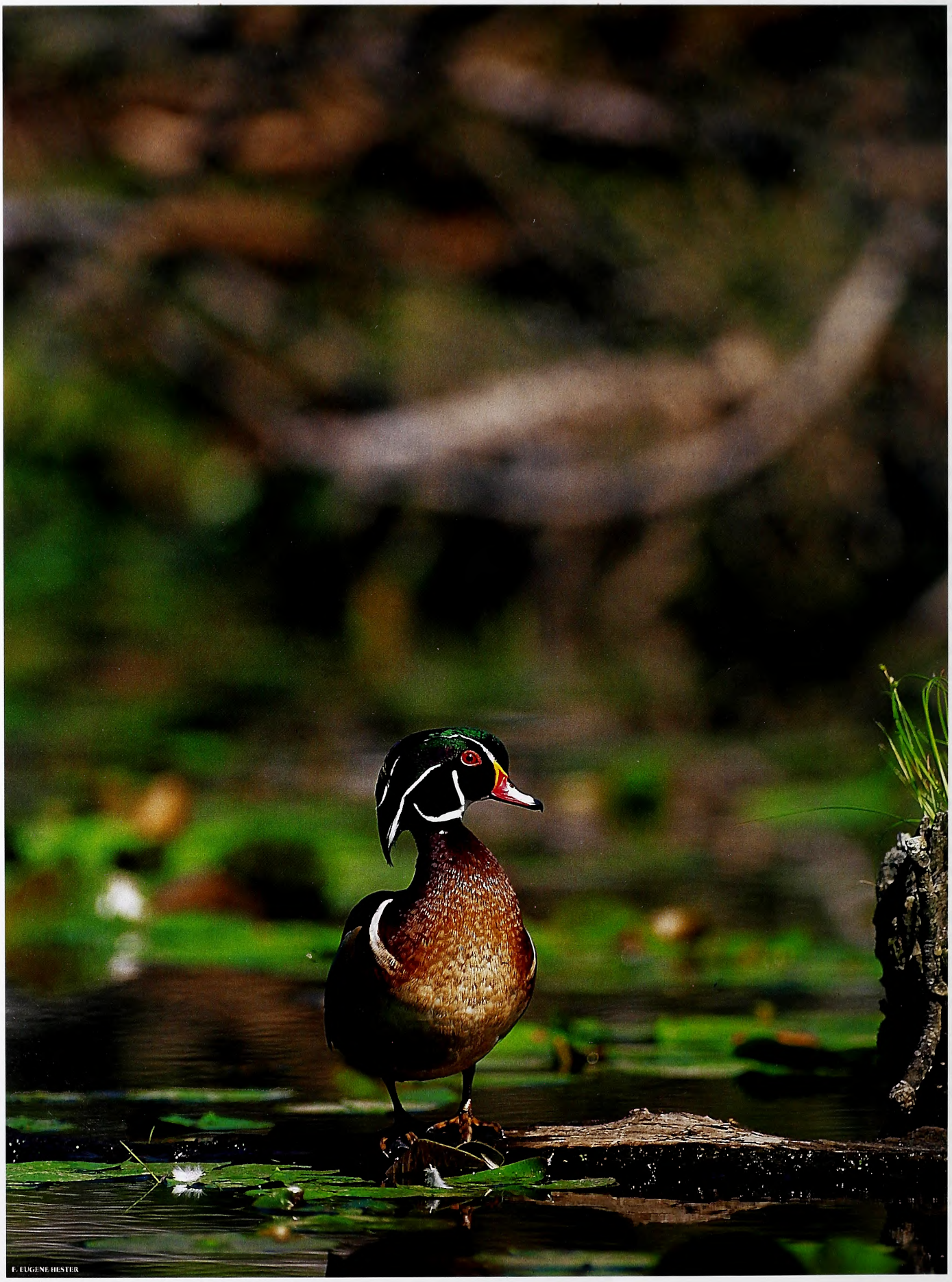
"We're always looking to tie properties together," Cobb said. "For example, some of those properties along the Tar River were additions right there at Shocco Creek Game Land. Some of the tracts along the Roanoke were additions, and some were adjacent to properties we already owned. Tillery Game Land is right there at the Roanoke. It's not on the main stem of the river, but it's still a high-priority area. All of them, for the most part, qualified for Natural Heritage Trust Fund or Clean Water Management Trust Fund money, although we paid for quite a bit of that acquisition ourselves. To qualify for Heritage or Clean Water means that there was high conservation value."

Dale Davis, the commission's management biologist for Districts 1, 2 and 4, said one of the most outstanding pieces of property from the IP sale is right there near the Roanoke, the 887-acre Wood's Island tract, which is now part of the Roanoke River Wetlands Game Land. All hunting on the game land is by permit only.

"It's a beautiful piece of property," Davis said. "Part of what makes it so special is the diverse habitat. Some of it is in bottomland, some in cutovers. Then it slopes uphill to an upland pine plantation, which IP did an excellent job of managing. We've even planted some longleaf there."

For hunters and anglers, Juniper Creek Game Land provides abundant opportunities, from white-tailed deer, black bears and wild turkeys to waterfowl, bobwhite quail and warmwater fishing.

Davis has yet to hunt the property, but only because he hasn't been fortunate enough to draw a permit. The tract once served as a hunt club for IP employees. "It has excellent deer and turkey hunting," he said. "A couple of our technicians hunted there and had a fantastic turkey hunt."



E. EUGENE HESTER

The Right Price

In addition to being high-quality parcels of land that fit well into the game lands program, the IP purchase also was a good business deal.

"It was an opportunity to get a large acreage in total at a comparatively reasonable price," Cobb said. "The IP land ended up being less than $1,000 an acre. Compared to most of the land that we're buying, even rural property, none of it is even coming close to that across the board. Even if you're talking about a few hundred acres, you're often in millions of dollars. Overall it was an opportunity to acquire a lot of high-quality property at one time."

The addition to the game lands program was the largest since 1971, when the commission expanded game lands from 700,000 acres to 1.5 million acres by folding into the program approximately 800,000 acres of U.S. Forest Service land in Croatan, Uwharrie, Pisgah and Nantahala national forests, plus some state-owned public land and private industrial forests, including some lands owned by International Paper. Today, the commission has about 2.1 million acres in game lands from the Coastal Plains to the Mountains and owns outright about 470,000 acres.

Although land owned outright by the state, through the commission, is only about 25 percent of the total, that figure has grown. Having ownership of a game land provides the commission more opportunities for management yet places the burden of management entirely on the commission.

"The big change over the last 20 years is that the additions have been state-owned land," Cobb said. "It's really been a significant increase. There's been a lot of land added, but not a lot of stewardship money added. That's money to hire people to manage the property, money to post boundaries and grade roads and do prescribed burning and plant fields. We have more latitude in what we do on the state-owned game lands.

"We're involved in some of the management activities on some of the national forest lands, but management activities there are dictated by the U.S. Forest Service and not by us. It's better for us if we have more latitude in what we do, but it puts the responsibility on us for trying to do everything. A lot of times, that's hard to do."

The stewardship aspect, the actual managing of the property, is something most hunters, fishermen and other users of public land do not consider. For them, the addition of the land into a game lands program is the ultimate act in the scenario. That's far from the actuality. Managers must decide where to concentrate their work, which roads will be graded and graveled multiple times each year, which roads will have to be closed, which game lands have sufficient staff to conduct prescribed burning, which do not. "It's a constant prioritization," Cobb said.

Perfect Timing

The IP lands could well be the last significant single addition to the game lands system that we see for some time. North Carolina was fortunate that the deal came along when it did.

"There's no way that deal could be put together today," Cobb said. "The monies that were available through Clean Water and Natural Heritage are not available today, and I certainly would not recommend to the director that we take out a large land acquisition bond today. The timing was critical. I can't imagine us being able to do that now."

That is a predicament Cobb hopes the Wildlife Commission does not find itself in again. "We really need to figure out a new model," he said. "For years there was a significant amount of money available to protect land—not as much as we needed, but still a pretty significant amount. And there was property out there, but some of the really high-quality conservation properties were not on the market. The economy takes a dive, and a lot of property is available right now, but many of the funders have dried up, for the most part.

"There's a real need for a new model as to how we fund land conservation and protection, so that in times when our economy is such that there is a lot of land available, we have a lot of money available to buy it with. But the model we've always worked under doesn't work that way.

"What we have to do is figure out funding sources that are not so directly tied to the exact condition of the state's economy. The Heritage program is funded based development levels. When the housing market slumps and development slows, revenues into the Natural Heritage Trust Fund fall. When the state budget is in the condition it's in, opportunities for money to be put into the Clean Water Trust Fund go down."

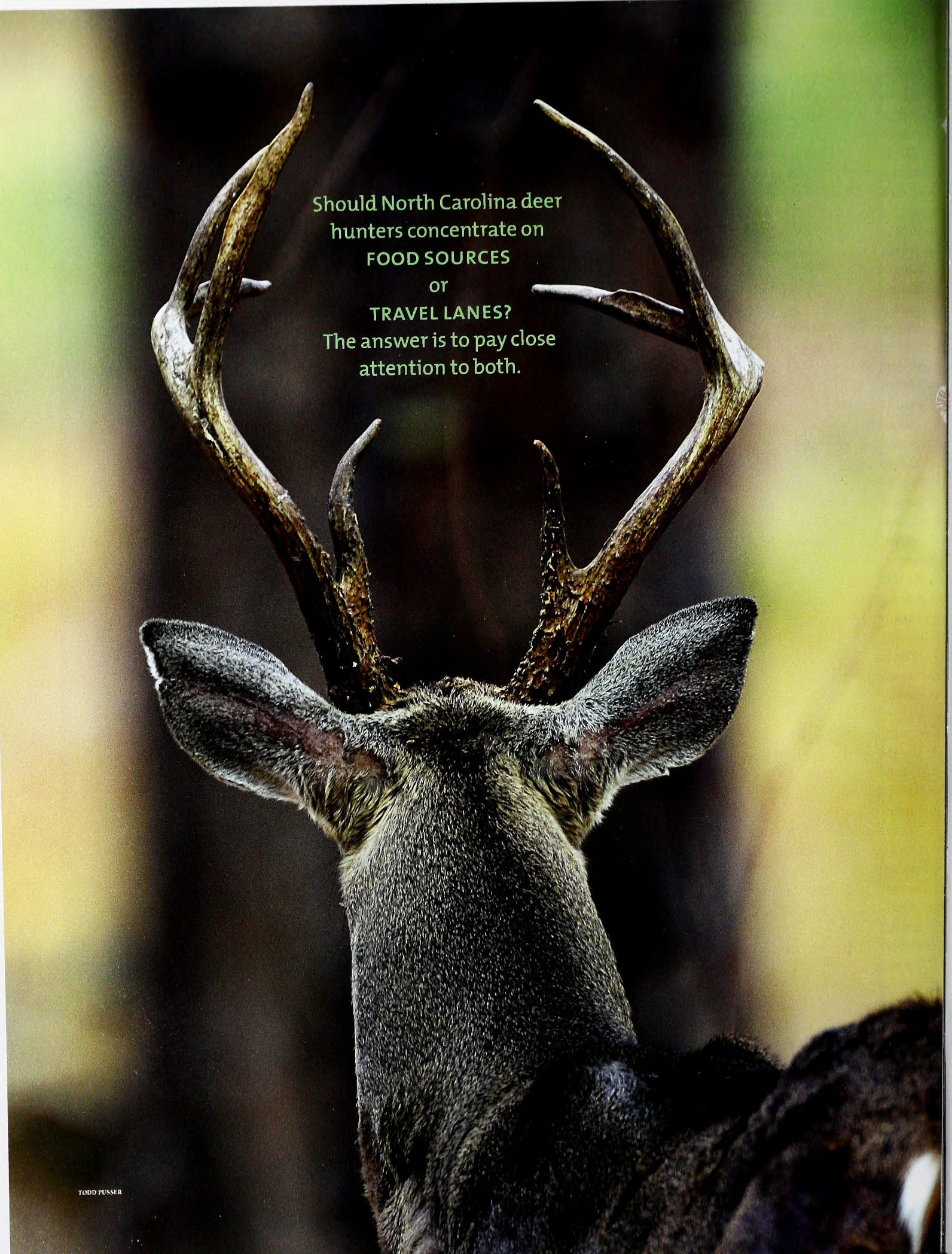
The addition to the game lands program was the largest since 1971, when the commission expanded game lands from 700,000 acres to 1.5 million acres.

What form that new model might take is uncertain. Perhaps it would take an endowment fund, something similar to the commission's Wildlife Endowment Fund, which has worked very well for more than 25 years. A fund such as that might be slow to grow in the first years but would begin to build more rapidly as the fund reaches 10 to 15 years of age.

"There are a lot of people thinking about that right now, but we haven't quite figured it out," Cobb said. "But we are working on it."

Deals such as the massive IP acquisition don't present themselves often. But a new funding model could mean that when opportunities do come along, the timing and the state of the economy might not be so critical. ◆

Jim Wilson is the associate editor of WINC.

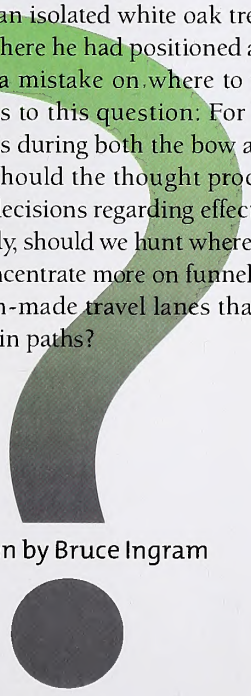

Should North Carolina deer hunters concentrate on
FOOD SOURCES
or
TRAVEL LANES?
The answer is to pay close attention to both.
TODD PUSSER

food or funnels

Late in September 2008, I made plans to go bowhunting with Sparta's Jacob Irvin on an Alleghany County farm. When I arrived at the farm on a Friday evening, Jacob took me to three potential stand sites. One was a funnel where there was no food but led to a food source, the second was where a Northern red oak was dropping acorns, and the third was where a scarlet oak was shedding its nuts near a clear-cut.

I knew that the decision I made that evening would determine my success or failure the next morning. With darkness rapidly approaching, I chose option three. As Saturday evolved, it was clear that I had made the wrong decision, as I saw five deer, including a buck, walk through the aforementioned funnel. After I finished hunting, I encountered Jacob's brother, Seth, who could have shot any of three deer that came to an isolated white oak tree (which was letting loose its nuts) where he had positioned a stand.

Obviously, I made a mistake on where to position my hang-on, which leads to this question: For those of us who pursue whitetails during both the bow and various gun seasons, what should the thought process be for making intelligent decisions regarding effective stand location? Specifically, should we hunt where the food is or should we concentrate more on funnels—that is, natural or man-made travel lanes that cause deer to take certain paths?



Written by Bruce Ingram

Evin Stanford is in charge of managing deer for the N.C. Wildlife Resources Commission, and he believes that the answer to the food-or-funnel question is partially based on how well the oaks have produced acorns.

"Probably the most important thing I stress when we have an abundant acorn crop is that hunters need to adjust their hunting tactics to increase their chances of observing deer," Stanford says. "When acorns are plentiful, deer will often focus all of their foraging efforts on acorns. The hunter that hunts only over open areas—for example, agricultural fields—and/or those that hunt over bait will often see very few deer during years with a good mast crop.

"During years with a good mast crop, I often receive complaints from hunters that say they are not seeing deer. Their perception is their deer herd has been decimated by overhunting or disease, when in reality the deer are present. The hunter simply needs to adjust his or her hunting method and put himself or herself where the deer are."

Stanford also emphasizes that deer don't have to travel as much to find food when acorns are plentiful. They often can fill their stomachs in short order without having to move very far, and then they can bed down or otherwise rest. The less they move, the less vulnerable they are to hunters. Hunters can somewhat solve the problem of deer moving infrequently by finding oak trees that have dropped large numbers of acorns and putting themselves right at the deer's dinner table, emphasizes the biologist.

Complicating the acorn situation is that deer do not regard all nuts produced by the white and red oak families as equal.

"White oak species are generally more appealing to deer because they tend to have lower tannin levels, which makes them less bitter," says Stanford. "Although chestnut oaks are a white oak species, they have relatively high tannin levels and are generally less preferred than other white oak species. On the flip side, the pin oak is a red oak species that is relatively low in tannin levels, is relatively sweet tasting and is often sought after by deer.

"However, although many red oak species have high tannin levels and are generally less preferred than many white oak species, deer will tend to focus their foraging efforts on all available acorn sources before turning to other food sources."

As a group, continues the deer biologist, acorns are high in energy and are available at a time when deer are trying to maintain body condition during the rut and trying to store energy for the winter. In many instances the presence or absence of acorns is the most important factor for determining where deer will feed and travel during fall and winter.

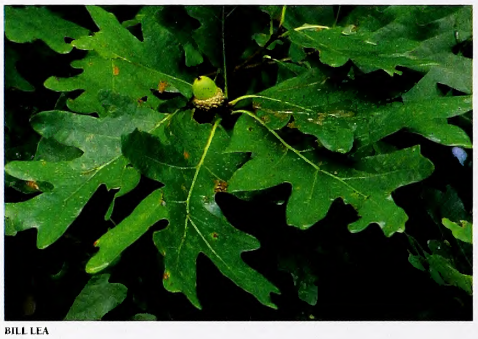
A Closer Look at the White Oak Family

As Stanford emphasizes, North Carolina whitetails generally favor the white oak species acorns over those of any other members of the white and red families. The white oak family includes such species as the white, post, chinquapin and chestnut oaks—all of which thrive in North Carolina.

The white oak (*Quercus alba*) itself grows across the vast majority of the Tar Heel State, doing well in both uplands and lowlands. Arguably, this is the most important tree for wildlife in the state, as numerous game and nongame animals from bears to songbirds relish its nuts. Even American Indians once used its acorns as a food source.

"White oak species are generally more appealing to deer because they tend to have lower tannin levels, which makes them less bitter."

– Evin Stanford, NCWRC deer biologist



BILL LEA

WENDY VANDYK, BUGWOOD.ORG

BRUCE INGRAM

Members of the white oak family include (from left) the white oak, the post oak and the chinquapin oak.

Characteristics: Whitish, slightly furrowed bark. Leaves measure 4 to 9 inches with five to nine rounded lobes; red or brown in autumn. Egg-shaped, 1-inch or so acorn with cap covering about a third of nut.

Deer also apparently delight in the acorns of the post oak (*Quercus stellata*). I have observed them leaving other food sources when these nuts start to drop. Unlike white oaks, which often grow in stands, post oaks are more likely to be found by themselves, especially along old fencerows. One of the best deer-fetching post oaks I have ever found was one that was the only hardwood growing in a pine stand. Post oaks do well in a variety of soils across North Carolina.

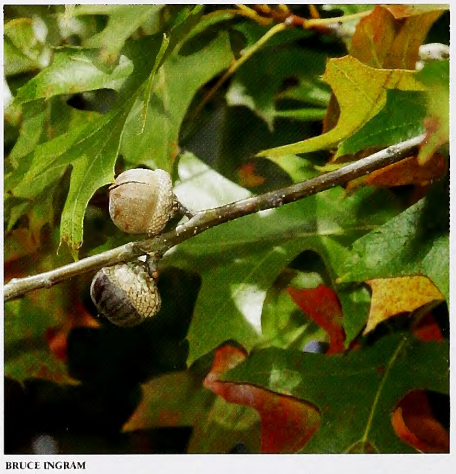
BILL LEA

Deer don't always wait until acorns drop to feast on them.

BILL LEA

No definitive answer to the food-or-funnel question exists unless an individual can find a spot that contains both.

BRUCE INGRAM



BRUCE INGRAM

BILL LEA

BRUCE INGRAM

Members of the red oak family include (clockwise from lower left) the red oak, the chestnut oak, the pin oak and the scarlet oak.

Characteristics: Light gray bark with fissures. Leaves 3 to 6 inches with five rounded lobes; brown in autumn. Acorn is similar to that of white oak except that cup can cover up to half of nut.

The chinquapin oak (*Quercus muehlenbergii*) is what I call a dessert tree. When the small acorns from these trees start to fall, deer will come by for a quick bite and then depart. A number of times during bow season, I have arrowed whitetails on their way to or from lone chinquapin oaks. Chinquapin oaks grow mostly in the western part of the state, often in dry, alkaline soils. If you find a sole chinquapin oak in a grove of red oaks and all the trees are shedding acorns, you can count on the deer feeding on those of the chinquapin oak first.

Characteristics: Light gray bark with fissures (similar to the post oak). Leaves are very different however, as they are 4 to 7 inches long with eight to 13 pairs of sharp-lobed brown or red leaves in fall. Acorns are often little more than a half inch long (again the dessert theme) and egg-shaped; cup covers one-third of nut.

Chestnut oaks (*Quercus prinus*) are the proverbial ugly duckling of the white oak family, and Stanford correctly points out that they do not produce a preferred nut. Indeed many times I have witnessed whitetails walking by a heavily bearing chestnut oak toward lightly bearing red or white oak trees.

Nevertheless, late in the season when wildlife has consumed the acorns of other trees or when a hard mast crop failure has occurred, deer will forage on the bounty of chestnut oaks. From my experience, another plus of this species is that it seems to engender acorns far more regularly than do the other white oak family members, especially the white oak itself, which is notoriously irregular in this department.

Chestnut oaks thrive in the state's mountain and rolling hills country, especially becoming predominant in rocky, upland soil where it will occur in pure stands.

Characteristics: Gray, deeply furrowed bark. Leaves are 4 to 9 inches long with seven to 16 pairs of rounded lobes. Egg-shaped acorn can be quite large, often up to 1¼ inch long, with cup covering a third of nut.

A Closer Look at the Red Oak Family

The red oaks as a group—Northern red, scarlet, pin, black and blackjack—are crucial deer foods in North Carolina. I agree

with Stanford that deer will feed on these red oak acorns before they will turn to soft mast, food plots or agricultural fields.

Certainly, one of the most important members of this family is the red oak (*Quercus rubra*) itself. This species thrives over the western two-thirds of the state, doing well in a wide variety of habitats from moist to rocky to sandy. Like other members of the family, the red oak's acorns take two years to mature.

Characteristics: Black, rough bark; inner bark is reddish and has pungent smell. Dark red fall leaves are 4 to 9 inches long with seven to 11 wavy lobes with bristle-tipped teeth. Egg-shaped 5/8- to 1 1/8- inch acorn with broad, saucerlike cup covering one third of nut.

As Stanford notes, the pin oak (*Quercus palustris*) acorn is a preferred member of the red oak family, even though in North Carolina this species is located mostly in the central part of the state and is uncommon in most places except suburban yards. Many times I have seen "yard" deer consuming these nuts. The pin seems to do best in moist soils. Compared to most other oaks, it is easy to transplant and inexpensive to propagate.

Characteristics: Dark gray bark with ridges. Red or brown fall leaves are 3 to 5 inches long with five to seven deep lobes that end in sharp bristles. Roundish, 1/2-inch acorn with thin saucerlike cup.

On my trip to Alleghany County, I guessed wrong when I hunted next to a scarlet oak tree (*Quercus coccinea*), but on many other occasions this species has drawn whitetails in for me and many other hunters. In North Carolina, the scarlet oak commonly occurs in much of the state except for the coastal region. The species does well in a variety of soils and habitats.

Characteristics: Dark, rough, furrowed bark. Scarlet fall leaves are 3 to 7 inches long with seven deep-cut lobes that end with bristle-tipped teeth. The acorn is 1/2 to 1 inch long with thick, round, deep cup.

Decision Time

So what should we concentrate on this deer hunting season, food or funnels?

Generally, I will, on average, hunt a food source before I will hunt a funnel, regardless of the season. However, when I become confused about where the deer are feeding, that's when I turn to funnels. I asked Stanford for his thoughts on the subject.

"Note that I tend to stray away from hunting/opinion types of questions and try to stick to biology," he says. "With that said, it is typically a safe bet to hunt food sources when they can be identified. However, hunting funnels can be a good tactic when consistent food sources cannot be identified. Hunters can also attempt to identify bedding areas and hunt travel corridors and funnels going to and from them. However, of course, the hunter should make every effort not to disturb the primary bedding area, which might cause deer to abandon the area."

Tree Identification Sources *for* Hunters and Naturalists

"The Audubon Society Field Guide to North American Trees: Eastern Region," www.randomhouse.com, 1-800-733-3000

"Peterson Field Guide to Eastern Trees," www.houghtonmifflinbooks.com, 1-800-225-3362

NATURE'S WAYS

How Do Deer Digest Their Food?
See Nature's Ways, page 39.

Perry Sumner, Wildlife Commission section manager for the wildlife division, says the food-or-funnels question has the classic answer of "That depends." But he does offer one solution.

"The ideal way to solve the problem is to hunt a food source in a funnel," says Sumner. "On a recent trip to Bertie County, I hunted a saddle that connected a series of ridges. When the deer wanted to go from ridge to ridge, the most convenient way for them to do so was to walk through that saddle."

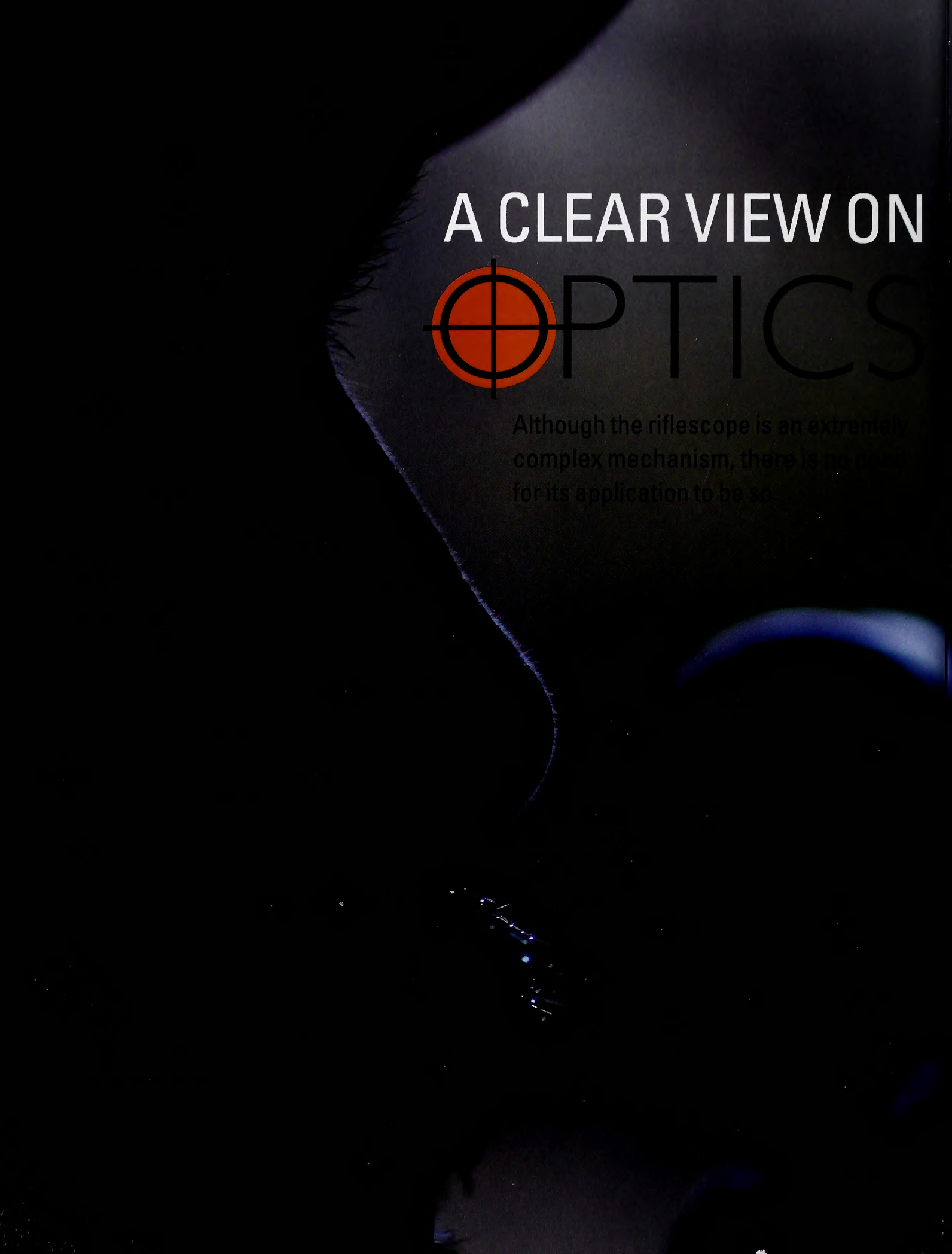
Deer, like humans and a host of other creatures as well, would rather avoid climbing a steep incline if they can find another way to travel to where they want to go. And a saddle, which is a dip in the topography that connects two or more ridges, is an ideal natural funnel. The words pass, notch or gap are often substituted for saddle, but whatever the elevation, it is the easiest path between higher areas. This particular Bertie County saddle features a block of woods and a field on one side, and a woodlot and pond on the other side.

During the daytime especially, the deer are, in effect, hemmed in by the wooded hillsides above them and constricted by the field and pond below them. If the whitetails are to travel about unseen and yet avoid the precipitous hillside above, they have to amble through the saddle.

"When I found several white oak trees that were dumping acorns in that saddle, I knew that I had found the perfect stand site," continues Sumner. "I placed a trail camera in the area and recorded numerous deer coming to one white oak in particular, plus foxes and bobcats were moving through the area. When the season starts, I'll have a tree stand positioned overlooking that saddle, so that I can watch those white oaks. I've killed several nice deer there in the past."

As Sumner notes, no definitive answer to the food-or-funnel question exists unless an individual can find a spot that is both a funnel and a source for food. North Carolina's diverse habitats offer many opportunities to find such a place. To me, the most appealing aspect of pursuing whitetails is trying to answer anew this question every season. ◆

Bruce Ingram is a freelance writer and author living in western Virginia. He hunts bow and gun season for white-tailed deer each year.


A CLEAR VIEW ON
OPTICS
Although the riflescope is an extremely
complex mechanism, there is no need
for its application to be so

WRITTEN BY MIKE HUMPHRIES
PHOTOGRAPHED BY RUSSELL GRAVES

The modern hunting rifle is a pretty simple, straightforward mechanism. Sure, its manufacturing and development often involve decades of refinement, but the result is surprisingly basic.

However, one of the most common accoutrements for the hunting rifle is not nearly so uncomplicated. Combining precision adjustment mechanisms, finely ground and honed glass and a tough aluminum body, the riflescope is a highly refined and precise mechanism. And this complexity carries through to the terminology that surrounds it.

Having been around firearms and optics since my teenage years, I consider myself reasonably well informed about this type of gear. However, even though I have used riflescopes for the past two decades, even I have been a bit perplexed at times by some of the terminology that accompanies them: Parallax. Eye relief. Field of view. Exit pupil. Confused yet?

However, there is no reason for it to be so complicated. Do you know how to operate a basic slide-action shotgun? How about a bolt-action rifle? I bet you do, and this knowledge is in no way contingent upon understanding the technical nuances of the way the firearms were manufactured. Do you care about topics such as their metallurgy? Probably not, as long as they work reliably.

EYEING THE PRIZE

So why can't this minimalist's approach be applied to optics as well? Sure, all that technical jargon can be interesting, but isn't the real-world application of a riflescope the most important thing for most outdoorsmen?

To accomplish this, I called Leupold & Stevens Inc., one of the United States' most prominent optics manufacturers. Pat Mundy, marketing communications supervisor for the company, helped me start distilling all the myriad, potentially confusing elements of the riflescope down to the basics.

One of the first topics discussed was what Leupold refers to as the "optical triangle." Made up of three parts, the triangle consists of eye relief, field of view and magnification. These three elements are incredibly important factors when it comes to riflescopes, and each directly affects the other.

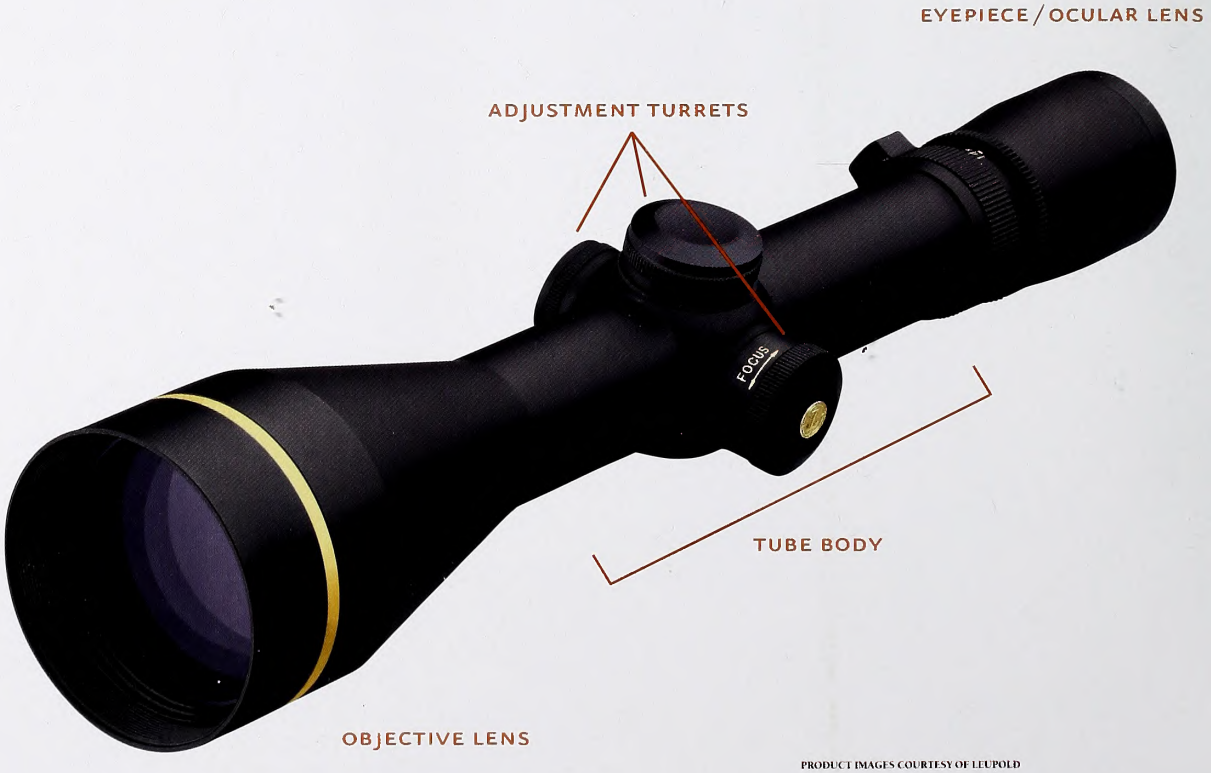
Eye relief is the distance from the shooter's eye to the ocular lens (the rear lens at the back of the scope) that is required to see the full field of view of the optic. A rifle with a long eye relief allows the shooter to keep his face farther away from the optic than does a scope with short eye relief. Field of view, simply put, is the horizontal width that can be viewed through a riflescope. Field of view is measured usually at the width visible in either feet or yards at a subject distance of 100 or 1,000 yards. Magnification is the power at which the image seen is magnified by the optic.

Each of these factors bears a direct relationship with the others. Adjustments to one will directly affect the other two. For example, higher magnification will reduce the field of view and shorten the eye relief of the scope. Conversely, lower magnification will provide a wider field of view and a longer eye relief.

HEAD-ON APPROACH

Starting at the front, the most prominently visible part of most riflescopes is the objective lens. In most conventional scopes, this is the large, belled forward portion of the scope (although some low-power scopes sport a straight tube without an enlarged objective).

The objective lens is the forward piece of glass in the scope, and it provides image definition and magnification. The reason that it is often oversized when compared to the main



PRODUCT IMAGES COURTESY OF LEUPOLD

tube of a riflescope is that a larger-diameter objective lens allows for greater magnification while still offering generous exit pupil.

You might be asking at this point, What is exit pupil? Simply put, exit pupil is the diameter of light that is transmitted to your eye through the optic. To see the exit pupil of a riflescope, hold the scope up at arm's length and look through it. It is the circle of light you see through the scope.

At its most basic, a larger-diameter objective lens lets more light through, and more light means that the riflescope is more capable of performing in low-light conditions. Do you want to be able to count the points of a buck's antlers in the early dawn's dim light? More light transmitted through the scope will enhance that ability.

TUBE STRENGTH

Extending back from the objective lens portion of the riflescope is the narrower portion of the optic referred to as the main tube or body of the scope. This portion of the scope interfaces with the scope rings used to attach the riflescope to the firearm.

Riflescope tubes are available in several different standardized diameters — a very important point when it comes to buying rings for your scope. The most commonly encountered tube diameter is 1 inch, which offers light weight and affordability when compared to thicker-diameter tubes. This diameter will be more than enough for most users and is most commonly seen on simpler scopes.

Somewhat less common is the 30mm-diameter tube. This thicker tube is stronger and much more resistant to bending under extreme circumstances. This diameter tube is partieularly popular with long-range shooters as it allows a greater range of adjustment for elevation, because there is more room within the tube for the optical elements to move. This diameter is most often seen on higher-end optics with more adjustments.

Even less common is the 34mm tube diameter, which offers even greater rigidity and strength and even more range of adjustment. This diameter tube is primarily seen on the highest-end optics.

MEETING IN THE MIDDLE

Although the advantages of a scope can be numerous — increased clarity, greater ability to clearly identify a target, greater potential for precise accuracy when used correctly — it is all for naught if you cannot adjust the aiming point of the riflescope to where your bullets are actually hitting.

ADJUSTMENT TURRETS

POWER SELECTOR RING

Each click of either the windage or elevation dials (left) in the scope's adjustment turrets will move the point of aim roughly 1/4 inch at 100 yards. Variable-power scopes have a power selector ring (below, left) that allows you to adjust the magnification.

The middle portion of the main tube of a rifleseope is home to some of the most important features of the scope — the adjustment turrets. On most scopes, there are two of these turret housings — one for windage adjustments and another for elevation.

Usually covered with a screw-on cap, these rotating adjustable dials allow the shooter to move the aiming point to coincide with the bullet's point of impact. Windage adjustments move the aiming point left or right, and the elevation moves it up and down.

Commonly, each "click" of adjustment moves the aiming point 1/4 m.o.a. (minute of angle) at 100 yards. Minute of angle is a unit of measurement that measures roughly 1 inch at 100 yards. So, each click of either of these dials with 1/4 m.o.a. adjustments moves the aiming point roughly 1/4 inch up, down, left or right at 100 yards.

PARA-WHAT?

Though most riflescopes feature the two standard turrets mentioned above, some feature a third turret designed to allow for parallax adjustment. Parallax is an optical illusion that appears when the image in the scope exists in one focal plane and the scope's aiming reticle is located in another, resulting in a shift of point of impact. In short, if parallax is present, it is very easy to be aiming at a point that does not coincide with the intersection of the crosshairs. Although this error is often minimal in a hunting scope used for big game, it is very important to eliminate it when shooting smaller animals or varmints at longer distances.

If this is confusing, don't feel bad. Parallax is a mystery to many shooters. The good news is that this situation generally has an impact only in long-range shooting where a subtle shift in the point of impact is multiplied by extreme distance. In most cases of normal field shooting, the importance of this is for all intents and purposes negligible.

Instead of the third turret located in the center of the main tube, some scopes allow for adjustment of parallax with an adjustable objective (AO) ring at the objective bell end of the scope.

ADJUSTING YOUR PERSPECTIVE

As you move farther toward the back end of the riflescope, whether you have a fixed- or variable-power scope comes into play.

All riflescopes can be divided up into these two broad categories. A fixed-power scope features one single set of magnification power, whereas a variable-power scope can be adjusted through a preset range of magnification powers.

Each of the two types has its strengths. Fixed-power scopes tend to be simple, rugged, light and more affordable. For those who hunt the same type of terrain and animals all the time, a fixed-power scope can be ideal. Variable-power scopes are more complex, generally heavier and often more expensive. They are ideal for those who may want to do close-up brush hunting as well as open-plain hunting with the same scope.

Though a fixed-power scope will have a plain main tube behind the adjustment turrets' central portion, a variable-power scope has a power selector ring on the rear portion of the main tube behind the adjustment turrets. This numbered dial allows the user to quickly and easily adjust the magnification power up or down.

"Although it can be tempting to run your scope's power setting to its highest magnification, we try to tell people that keeping the power low can have a lot of benefits," said Leupold's Mundy. "Set on a lower magnification setting, a riflescope gives the hunter a greater field of view, increased exit pupil size, longer eye relief and less of a need for precise eye alignment with the optic. If you need more power, then you can just quickly and quietly dial the scope's power up to what you need."

THROUGH THE LOOKING GLASS

At the rear portion of the scope is the eyepiece or ocular lens, a bell-shaped section of the scope that contains the reticle housing. The reticle is basically the aiming point that you see through the optic.

Sometimes referred to as the crosshair, the reticle housed within the eyepiece often consists of crosswires, a dot, a pointed post or some other visually distinct shape that appears superimposed on the field of view. Hunting scopes usually have prominent and bold reticles that are easy to pick up under stress or a quick snap shot. On the other hand, target and varmint models usually have finer lines that do not obscure the target as much

and are much more conducive to long-range precision shooting.

Depending upon your eyesight, the reticle may appear fuzzy when you look through the scope. As a result, many scopes have an adjustable eyepiece that allows you to bring the reticle into focus, often also with a locking ring to hold it in position once focused.

"This is one thing that a lot of people get wrong on their scope," said Mundy. "In reality it is very simple to focus this if you need to, but very few people know how to do it properly."

He explained that you should not try to focus the reticle while looking downrange at the target but rather should point the scope at the sky and quickly glance into it. "Do not look through it for a long period, as your eye will begin to compensate for the lack of focus," he said. With a few glances and a couple of twists of the eyepiece, the scope's reticle should be in focus. Tighten down the locking ring if there is one, and you should be all set.

PERUSING THE SHELVES

Now that you understand how a riflescope works, you might want to go down to the local sporting goods store and look at a few models for yourself. However, in addition to knowing the basics of the scope and its operation, it might be useful to discuss the basic nomenclature of the riflescopes that you will see.

Take for example a 3–9x40mm. The 3–9 indicates that it is a variable-power optic with a magnification range of 3X to 9X, and the 40mm indicates the diameter of the objective lens. This is a reasonably sized scope with a good-sized objective and good range of magnification. A 2.5x20mm scope is a fixed-power scope with 2.5X magnification and a relatively small 20mm-diameter objective lens. This is a small, lightweight and handy optic. As you can see, these simple combinations of numbers quickly give you a good idea as to what type of scope it is.

A riflescope, although seemingly complex and confusing, can be as simple to operate as your trusty hunting rifle. With all the technical nuances distilled down to their most basic elements, I hope that you feel comfortable enough to take advantage of this extremely capable accoutrement for your hunting rig. ◆

Mike Humphries is managing editor of Wildlife in North Carolina.

LOUDER THAN WORDS

All right. Now you know your way around the entire riflescope, and you should be quite capable of maneuvering around the marketing-speak you may encounter at a retail store. But that still leaves the question of what you should purchase.

There are many, many specialized variants available for very specific needs. For those who might be hunting in the Mountains or the hillier sections of the Piedmont where shots at distances of more than 75 yards would be rare, a compact and lightweight fixed-power riflescope might be the ticket. How about the flatter, more open lands as you move from the Piedmont into the Coastal Plain? This might call for a variable-power scope with a great deal more magnification.

For the everyday sportsman on a budget who is looking for one riflescope that can do it all, the tried-and-true 3–9x40mm is probably the ticket. Easily the most popular riflescope configuration, its 3–9X magnification offers a good balance between short-range and long-range capabilities. In addition, the 40mm objective lens diameter provides a good balance between compactness and performance, delivering a good amount of light transmission without being overly bulky like a 50mm or larger objective lens.

The result should be an excellent all-around riflescope suited to much of the hunting you will find in this state. However, I suspect many of you will find an excuse to buy more specialized scopes down the road. I know I have.

– Mike Humphries

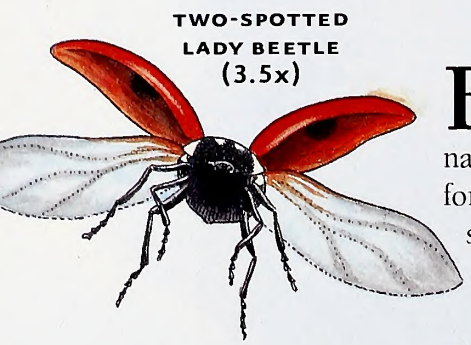
FOR MORE INFORMATION
Leupold & Stevens Inc.
14400 NW Greenbrier Parkway
Beaverton, Ore. 97006-5790
1-800-538-7653
www.leupold.com

They're the most successful creatures on earth. One out of every 10 living things is one. Welcome to

Planet Beetle

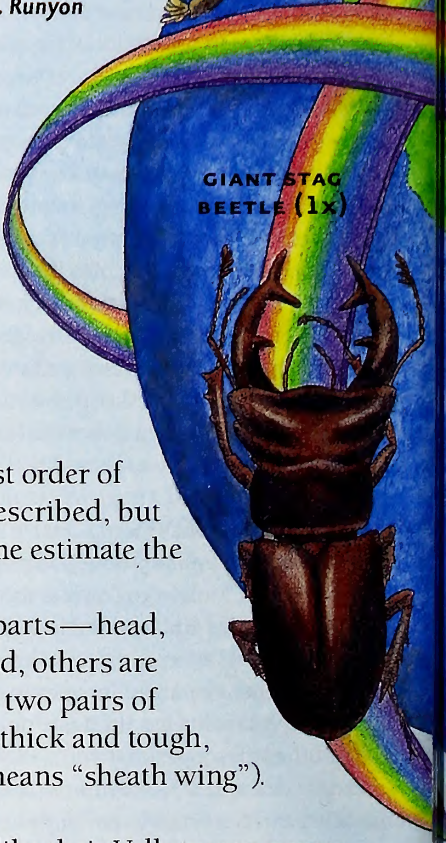
written by Jeff Beane / illustrated by Consie Powell / nature activity by Anne M. Runyon

EYED CLICK BEETLE (1.5x)


TWO-SPOTTED LADY BEETLE (3.5x)

British evolutionary biologist J.B.S. Haldane, when asked what could be inferred about God by studying nature, supposedly replied: "He must have an inordinate fondness for beetles." Whether or not Haldane actually said those words, beetles are spectacularly abundant, diverse and successful.

HERCULES BEETLE (2x)

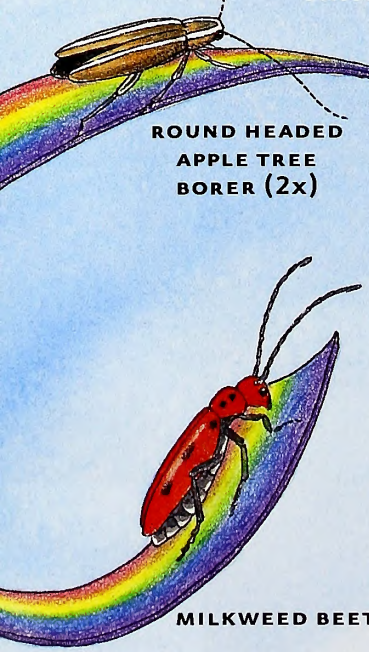

GIANT STAG BEETLE (1x)

BLUEPRINT FOR SUCCESS

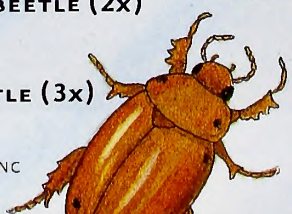
Beetles belong to the class Insecta. They form the order Coleoptera, the largest order of living things. Well over 100 families and some 350,000 species have been described, but many scientists believe that most of the world's beetles are still unknown. Some estimate the total number of species at over 8 million!

Like all insects, beetles have a tough exoskeleton, six legs and three body parts—head, thorax and abdomen. Their antennae vary greatly; some are short and clubbed, others are large and feathery or long and threadlike. Like most insects, they have two pairs of wings, but unlike most, only one pair is used for flying. The other pair, thick and tough, serves to protect the delicate flight wings and abdomen (Coleoptera means "sheath wing"). These protective outer wing covers are called elytra.

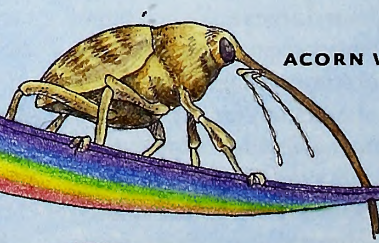
Most people picture beetles as shiny, domed insects, shaped like their Volkswagen namesakes, and trundling along like tiny armored tanks. This is a reasonable description of some, but many species deviate from it. Some are flattened or elongated. Many mimic other insects, spiders or worms, or are camouflaged to resemble plants or other inanimate objects. Females of some groups retain larval traits, never developing wings.


ROUND HEADED APPLE TREE BORER (2x)

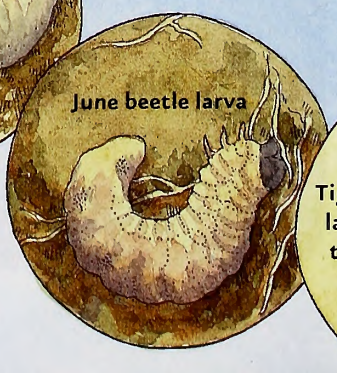
MILKWEED BEETLE (2x)

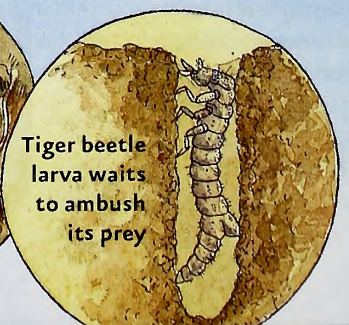

GRAPEVINE BEETLE (3x)

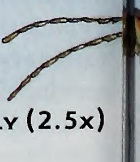
ELDERBERRY BORER (2x)

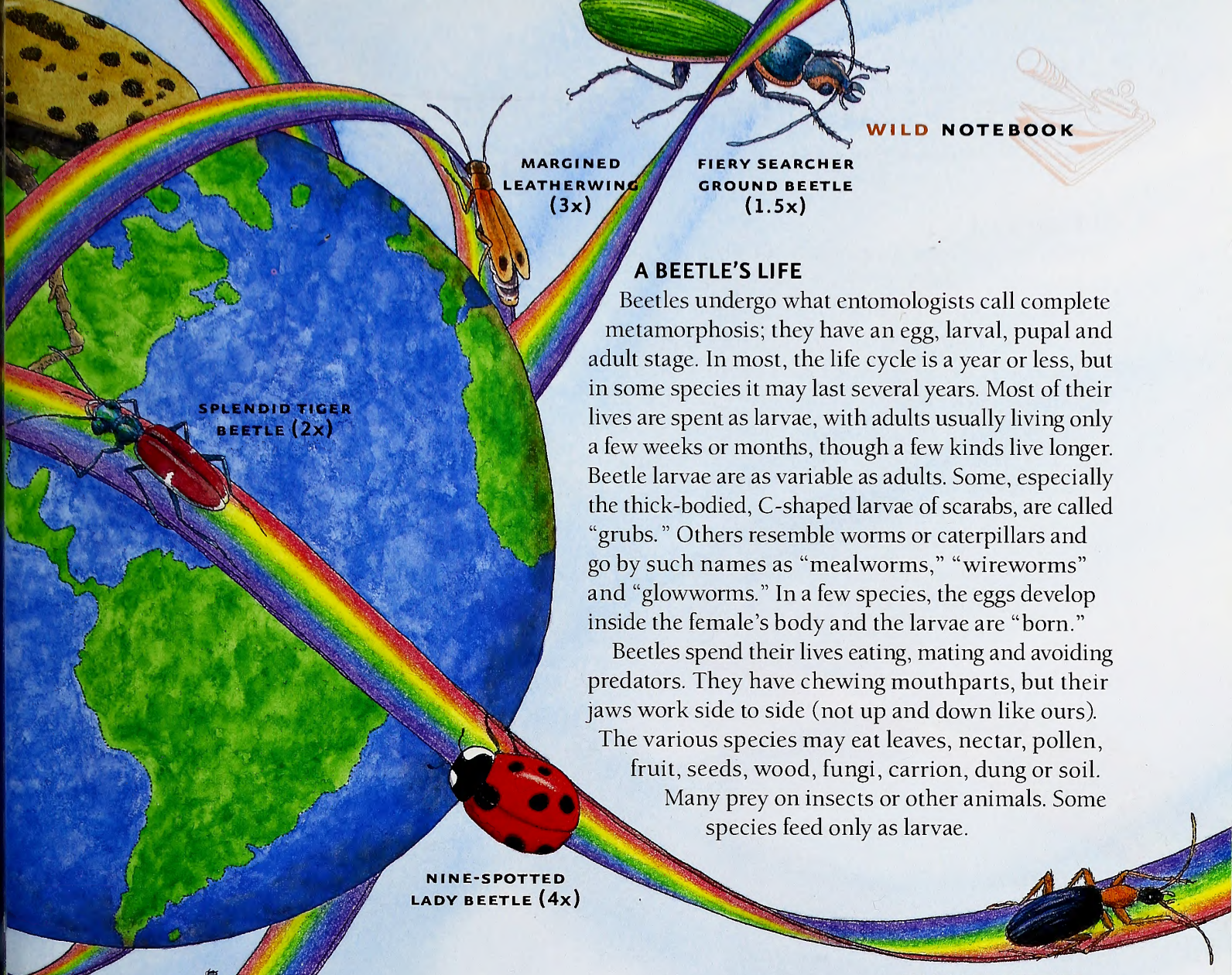

ACORN WEEVIL (6x)

Bess beetle larva


June beetle larva


Tiger beetle larva waits to ambush its prey

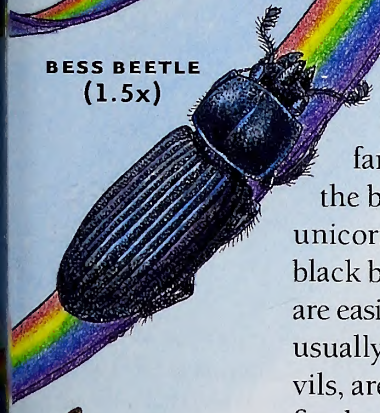

FIREFLY (2.5x)



A BEETLE'S LIFE

Beetles undergo what entomologists call complete metamorphosis; they have an egg, larval, pupal and adult stage. In most, the life cycle is a year or less, but in some species it may last several years. Most of their lives are spent as larvae, with adults usually living only a few weeks or months, though a few kinds live longer. Beetle larvae are as variable as adults. Some, especially the thick-bodied, C-shaped larvae of scarabs, are called "grubs." Others resemble worms or caterpillars and go by such names as "mealworms," "wireworms" and "glowworms." In a few species, the eggs develop inside the female's body and the larvae are "born."

Beetles spend their lives eating, mating and avoiding predators. They have chewing mouthparts, but their jaws work side to side (not up and down like ours). The various species may eat leaves, nectar, pollen, fruit, seeds, wood, fungi, carrion, dung or soil. Many prey on insects or other animals. Some species feed only as larvae.



DOWN-HOME BEETLES

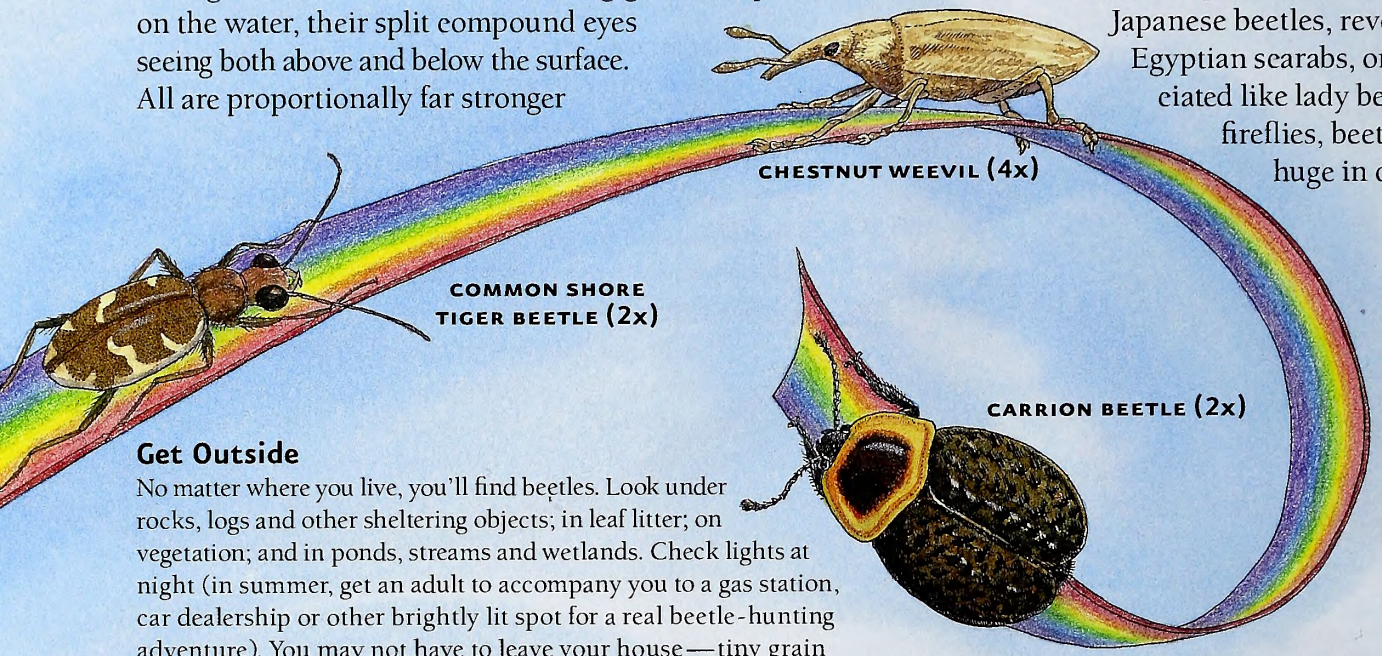
Beetles occur in bewildering variety, but some North Carolina species are familiar and easily recognized. Stag beetles, with their outrageous mandibles, resemble fantastic sci-fi creatures. Scarabs are a large family with many familiar species, including the beautiful green June beetle, the invasive Japanese beetle, the exotic-looking ox and unicorn beetles and the Eastern Hercules beetle—North Carolina's largest beetle. Shiny black bess beetles are familiar to anyone who has ever turned over rotten logs. Click beetles are easily identified by their defensive acrobatics. Children catch fireflies, or "lightning bugs," usually without realizing that these summer night icons are beetles. Snout beetles, or weevils, are a hugely successful family, easily recognized by their elongated heads. One of every five beetles (or about one of every 10 living things) is a weevil. Most long-horned beetles are easily recognized by their exceptionally long antennae. Jewel-like tiger beetles and metallic wood-boring beetles brighten woodland paths. Ladybird beetles, or "ladybugs," are appreciated for their beautiful color patterns as well as their reputation for eating aphids and other agricultural pests. Although seldom acknowledged for it, abundant and diverse ground beetles perform equal service as insect predators.

These beetles are mostly shown larger than actual size. For example, 2x means that the beetle is illustrated at twice life size.

SUPERBEETLES

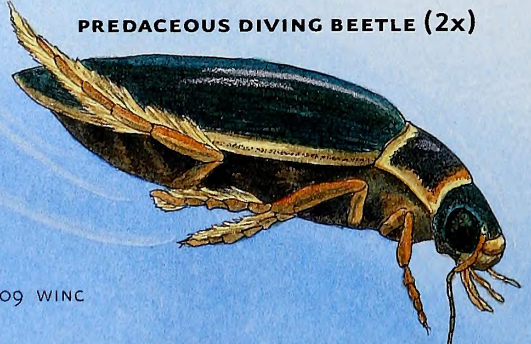
Beetles can perform awesome feats. Fireflies, glowworms and some click beetles communicate via bioluminescence (chemical light). Others talk by stridulation (rubbing body parts together to produce sound) or by banging their heads against wood. Jackknifing click beetles endure g-force (the force produced by gravity on accelerating bodies) that would kill most creatures. Bombardier beetles are chemical warfare experts, firing searing stink bombs at predators. Diving beetles swim like fish. Whirligig beetles spin on the water, their split compound eyes seeing both above and below the surface. All are proportionally far stronger than humans; some scarabs can carry over 800 times their own weight!

It's difficult to overestimate the importance of beetles. They are integral parts of most ecosystems (oceans are the exception, though a few inhabit seashores and intertidal zones). They are important predators, prey, parasites, pollinators, scavengers, decomposers, sanitation engineers and soil builders. They feature prominently in human history, culture, literature and folklore. Whether despised like boll weevils and Japanese beetles, revered like Egyptian scarabs, or just appreciated like lady beetles and fireflies, beetles loom huge in our world.



Get Outside

No matter where you live, you'll find beetles. Look under rocks, logs and other sheltering objects; in leaf litter; on vegetation; and in ponds, streams and wetlands. Check lights at night (in summer, get an adult to accompany you to a gas station, car dealership or other brightly lit spot for a real beetle-hunting adventure). You may not have to leave your house—tiny grain beetles (Silvanidae) may infest flour or cereal; carpet beetles (Dermestidae) may munch leather or fabric in your closet; ground beetles often wander into basements; and many tiny beetles may fly in on summer nights. How many different beetles can you find in your own yard? Most will be difficult to identify, but some species are easily recognizable, and many can be keyed at least to family with a good field guide. TheBugGuide.net website can be helpful, or you can try taking specimens (or sending photographs) to your local museum, nature center, university or agricultural extension office. The Arthropod Zoo at the N.C. Museum of Natural Sciences includes beetles in its exhibits.



Read and Find Out

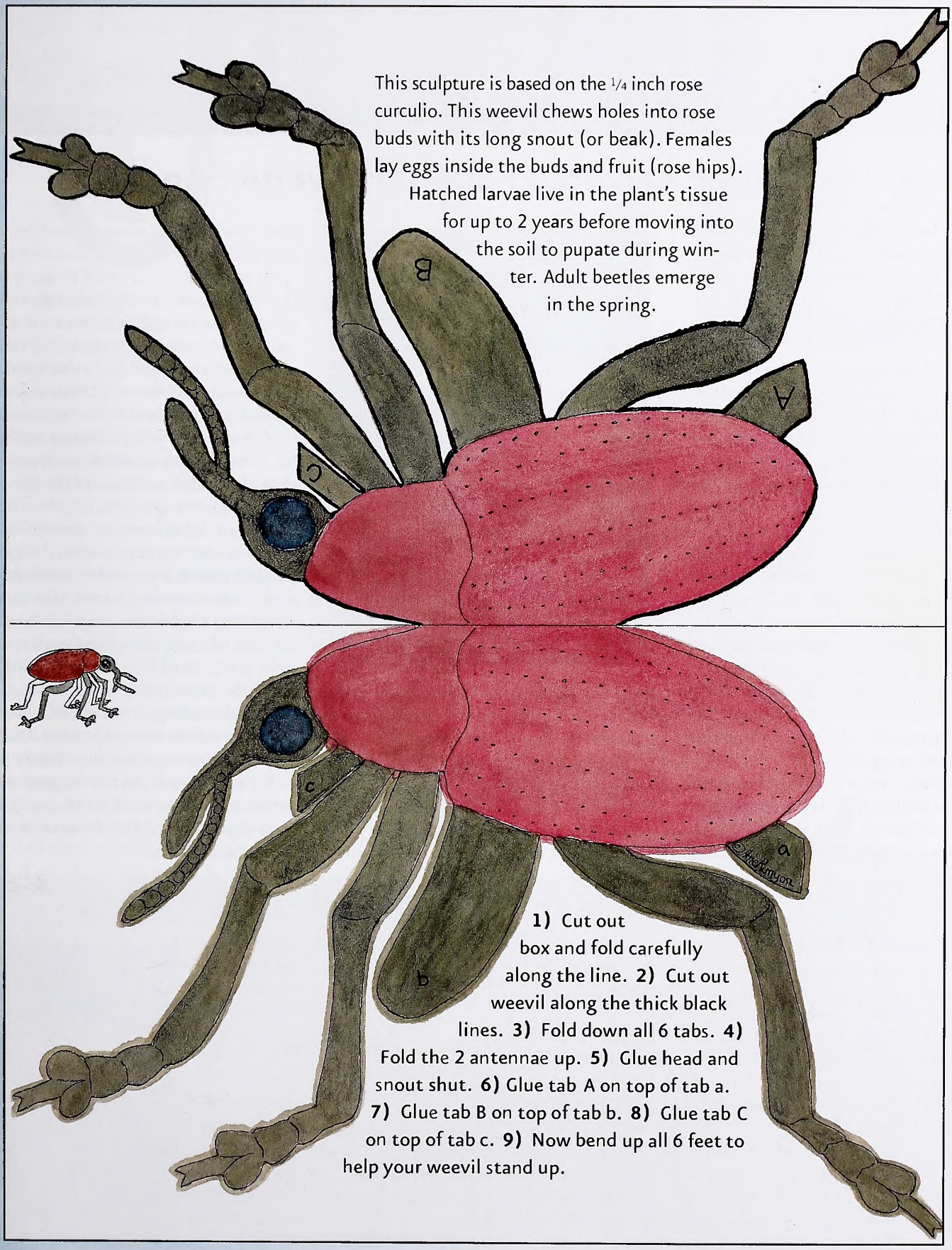
- "An Inordinate Fondness for Beetles" by Arthur V. Evans and Charles L. Bellamy, University of California Press, 1996.
- "A Field Guide to the Beetles of North America" by Richard E. White, Houghton Mifflin, 1983.

In *Wildlife in North Carolina:*

- "Beetle Mania" by Harry Ellis, April 1990.
- "Lights in the Forest" by David Lee, July 1990.
- "The Flipping Beetles" by Jeff Beane, Oct. 2000.
- "June Beetle Days" by Jeff Beane, July 2002.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make a Snout Beetle Sculpture



This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Kokanee Record a Familiar Swann Song

The Swanns of Swannanoa are keeping it all in the family when it comes to rewriting the freshwater fishing record book in North Carolina.

Ashley Swann reeled in a record-breaking 3-pound, 9-ounce kokanee salmon from Nantahala Lake in June, nearly two years after her father-in-law, Mark Swann, accomplished the same feat — twice in one month — by catching a 2.48-pounder on Aug. 3, 2007, and a 3.07-pound fish on Aug. 28.

"I had no clue that I had broken his record until I reeled it in and he said, 'You just beat my record,'" Ashley Swann said. "I had no intention of breaking his record, but I did."

Swann used a custom-made lure to reel in the fish, which measured 21½ inches in length and 12¼ inches in girth.

Unlike her father-in-law, however, this was her first time landing a big fish. In fact, it was her first time fishing on a boat. "I've only fished in creeks before and just caught little fish," Swann said. "This was my first time ever fishing for big fish."

Nantahala Lake, a 1,065-acre reservoir located in Macon and Clay counties, is the only body of water in North Carolina that supports a kokanee salmon fishery. N.C. Wildlife

NCWRC

Resourees Commission biologists say some kokanee in Nantahala Lake may get as big as 5 pounds during the spawning run.

The fish is native to the western United States, but was stocked in Nantahala in the mid-1960s by the Wildlife Commission in an attempt to establish the species as a forage fish for other predator fishes in the lake. This stock has remained and become a favorite target for anglers such as the Swanns.

Swann's fish was certified by Jacob Rash, District 8 fisheries biologist with the Wildlife Commission. To qualify for the state record, anglers must have caught the fish by rod and reel or cane pole, have the fish weighed on a scale certified by the N.C. Department of Agrieulture, witnessed by one observer, have the fish identified by a fisheries biologist from the commission and submit an application with a full, side-view photo of the fish.

For anglers who catch a kokanee salmon that doesn't quite measure up to this latest record-breaker but is 14 inches or longer or weighs 2 pounds or more, the commission has created a new kokanee salmon classification for its N.C. Angler Recognition Program. NCARP officially recognizes anglers who catch trophy-sized freshwater fish that do not qualify for a state record with a certificate featuring color reproductions of fish artwork by renowned wildlife artist and former *Wildlife in North Carolina* magazine editor Duane Raver.

For a list of all freshwater fish state records in North Carolina or more information on the State Record Fish Program, visit www.ncwildlife.org.

'Doe Tags' Come With a Price

Under a new law that went into effect July 1, hunters can continue to acquire an unlimited number of bonus antlerless deer harvest report cards each season. However, they will now be charged a $10 administrative fee for each report card they receive.

The N.C. General Assembly added the fee this year. The bonus eard, available since 2007, allows the holder to harvest two additional antlerless deer above the season bag limit of six deer in counties with a maximum either-sex season or municipalities enrolled in the Urban Archery Season.

The administrative fee, which applies to both resident and non-resident hunters, requires the N.C. Wildlife Resources Commission to charge $10 for each bonus card it issues to cover the administrative costs associated with the card, including commissions paid to wildlife service agents for their time spent issuing the bonus antlerless deer report cards.

Bonus antlerless deer harvest report eards can be purehased from the agency in three ways:

- Call the Wildlife Commission at 1-888-248-6834. Hours of operation are 8 a.m.–5 p.m., Monday–Friday.
- Visit a Wildlife Service Agent. Most are located in bait-and-tackle shops, hunting and sporting good stores and larger chain stores across the state.
- Visit the commission's headquarters at 1751 Varsity Drive in Raleigh.

KEN TAYLOR/NCWRC

Hit the Jackson County Trail

Jackson County, tucked deep in the North Carolina mountains, is home to the first official fly-fishing trail in the nation. The Western North Carolina Fly Fishing Trail, created by Julie Spiro and Craig Distl of the Jackson County Travel and Tourism Authority, came into existence earlier this year.

The trail has 15 stops, and the waters range from rivers, such as Tuckasegee and Horsepasture, to creeks of various sizes, such as Panthertown, Tanasee and Moses. All three species of North Carolina trout—brook, brown and rainbow—can be caught in the streams. Free maps are available through the trail's Web site at www.flyfishingtrail.com, at www.mountainlovers.com or by phone at 1-800-962-1911.

Spiro, executive director of the Jackson County Chamber of Commerce and the county travel and tourism authority, credits Distl, a county public relations representative, with coming up with the idea of the fly-fishing trail. "Craig was helping us promote fishing in the area, and he said, 'We ought to do a trail.' We brainstormed over places to include, worked out places that would be good to introduce fishermen to. We had to make sure we would not be crossing private land."

The whole process, said Spiro, took about seven months and involved the help of Sylva fishing guide Alex Bell and accomplished angler Bobby Kilby ("Grand Achievement," May 2008), a western North Carolina native who has caught trout in more than 1,000 state streams.

The map is free, but the fly-fishing trail does ask one thing—that every angler pledges not to litter or trespass and to leave the streams in better shape than they found them.

"There's a fine line between protecting resources while still encouraging recreation," Spiro said. "We want people to treat the land with the respect it deserves."

N.C. Partners Creating Wetlands for Wildlife

The North Carolina Partners Program (N.C. Partners for short) is a cost-share program to assist landowners with development of wetland wildlife habitat on private property. Cooperating agencies include the U.S. Fish & Wildlife Service, N.C. Wildlife Resources Commission, Ducks Unlimited and the Natural Resources Conservation Service. The U.S. Fish and Wildlife Service administers the program funded by the cooperating agencies.

Although emphasis is placed on creating shallow wetlands attractive to waterfowl, benefits to other wildlife and water quality are recognized as well. The program cost-shares water control structures and dike construction, and is available to landowners statewide on sites with adequate topography, suitable soils and water sources conducive to winter flooding. Several general restrictions include that areas must be managed and maintained for a minimum of 10 years, and landowners must be willing to flood areas from early fall through late winter. Areas may be hunted a maximum of three half days per week. No commercial hunting is allowed.

NCWRC

Since its inception in 1987, N.C. Partners has provided cost share on 85 projects creating over 4,200 acres of wetlands. Funding agencies have contributed over $300,000, with landowners contributing nearly $1,000,000. Recent surveys indicate peak waterfowl use of these areas at around 20,000. Numerous shorebirds and wading birds also take advantage of the high-quality habitat. For more information about the program, visit the N.C. Partners Web site at www.fws.gov/columbiawildlife/ncpartners.html.

CALENDAR OF EVENTS

Friday–Sunday, Oct. 2–4

Check out the seafood and entertainment, and learn about the cultural traditions that surround commercial fishing at the 23rd Annual N.C. Seafood Festival in Morehead City. Visit www.ncseafoodfestival.org.

Thursday–Sunday, Oct. 15–25

Enjoy the N.C. Wildlife Resources Commission exhibits—including a shooting range—and sign up for the commission's e-newsletter at the N.C. State Fair in Raleigh. Also crafts, livestock, midway games, rides, concerts, food and more. Visit www.ncstatefair.org.

Saturday–Sunday, Oct. 17–18

Pay homage to the state's most popular mollusk at the 29th annual North Carolina Oyster Festival in Shallotte. Events include oyster shucking contest and oyster stew competition. Visit www.brunswickcountychamber.org.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Camp Lejeune Youngsters Going Fishing

Although they don't know each other, Miah Domel, 9, and Zachary Kahl, 12, have several things in common. They both live near the coast, both began fishing at the age of 6, both come from outstanding military families stationed at Camp Lejeune, and both received free lifetime fishing licenses. The licenses were the top prizes in a statewide drawing from participants in 40 kids' "Fish-For-Fun" events held in celebration of National Fishing and Boating Week in June.

MELISSA McGAW / NCWRC

From left: Russell Rhodes of Neuse Sport Shop in Kinston, Miah Domel, former Wildlife Commission chairman Wes Seegars, Zack Kahl and Ned Jones of the North Carolina State Council of Trout Unlimited.

Zack won a lifetime freshwater/saltwater combination fishing license, donated by Neuse Sport Shop located in Kinston, while Miah won a lifetime freshwater fishing license donated by the N.C. State Council of Trout Unlimited.

They, along with their families, traveled to Raleigh on July 8 to receive their lifetime licenses and certificates at a N.C. Wildlife Resources Commission business meeting.

Zack's license, which is valued at $450, gives him fishing privileges in all public waters in North Carolina, including designated mountain trout waters, trout waters on game lands, joint waters and coastal waters. Miah's license, valued at $250, gives her fishing privileges in all public waters in North Carolina, including designated mountain trout waters, trout waters on game lands and joint waters.

Zack, who participated in the June 6 kids' fishing event at Ord Pond in Jacksonville, has been an avid catfish angler since the time when he was 6 years old that his dad took him to a farm pond where he caught several huge catfish. Since then, he has continued his passion for catfish fishing, reeling in a 10-pounder just last year. The son of Dawn and Gunnery Sgt. Barrett Kahl of Camp Lejeune, Zack is a rising seventh-grader at Brewster Middle School at Camp Lejeune.

Miah, who participated in the June 6 event at Lake Powhatan in Buncombe County, is also an avid angler, although her preferred fish to catch is Spanish mackerel because "they taste like chicken."

Miah, the daughter of Rachel and Sgt. David Domel of Morehead City, is a rising fifth-grader at Morehead City Elementary School at Camp Glen.

IN SEASON

This month, these seasons are open in North Carolina:

Black Bear: See *2009–2010 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for seasons and locations.

Bobcat: Oct. 12–Feb. 28.

Crow: Through Feb. 28.

Ruffed Grouse:
Oct. 12–Feb. 28.

Mourning Dove: Through Oct. 10.

Raccoon and Opossum:
Oct. 12 (sunrise)–Feb. 28.

Rails, Gallinule and Moorhen:
Through Nov. 13.

Squirrel: Gray and red, Oct. 1–Feb. 13; fox, Oct. 12–Dec. 31 in selected counties.

White-tailed Deer:
Eastern: Bow season through Oct. 9; muzzleloader season Oct. 10–16; gun season Oct. 17–Jan. 1.
Central: Bow season through Nov. 6;
Northwestern: Bow season through Nov. 13;
Western: Bow season through Oct. 3 and Oct. 12–Nov. 21; muzzleloader season Oct. 5–10.

Wild Boar: Through Feb. 28 only in Cherokee, Clay, Graham, Jackson, Macon and Swain counties. In the other 94 counties of the state, feral hogs are not considered to be wild boars, and the Wildlife Commission does not regulate them.

Migratory Waterfowl
Dark Geese (Canada and white-fronted):
Resident Population Oct. 7–17;
Southern James Bay Population Oct. 7–Nov. 7.

Snow, Blue and Ross' Geese: Oct. 17–Oct. 24.

Ducks, Coots and Mergansers: Oct. 7–10 (black and mottled ducks closed until Dec. 1).

Sea ducks: Oct. 1–Jan. 30 in Special Sea Duck Area.

Check the *Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

The Wildlife Endowment Fund

~An Investment for the Future~

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses and lifetime magazine subscriptions is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appropriate block)*:

- ☐ Sportsman Infant $200
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
  (under 1 year old—Application must be received before applicant has attained 1 year of age.)
- ☐ Sportsman Youth $350
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
  (ages 1 through 11—Application must be received before applicant has attained 12 years of age.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check appropriate block)*:

- ☐ Comprehensive Inland Fishing. $250
  (N.C. residents only—includes basic inland fishing, trout & trout waters an game lands)
- ☐ Comprehensive Hunting. $250
  (N.C. residents only—includes basic hunting, big game, game lands & N.C. waterfowl)
- ☐ Sportsman. $500
  (N.C. residents only age 12 or older—includes basic hunting & inland fishing, big game, game lands, trout & N.C. waterfowl)
- ☐ Coastal Reereational Fishing $250
  (N.C. residents only—includes coastal recreational fishing)
- ☐ Unified Sportsman/Coastal Reereational Fishing $675
  (N.C. residents only—includes same privileges as the Sportsman, plus coastal recreational fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

- ☐ Copy of Prior Year Hunting Lieense
- ☐ Copy of Hunter Safety Certificate of Competence
- ☐ In lieu of eopy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side *(please print legibly)*:

Name of Applicant _____

Daytime Phone _____

Mailing Address _____

Resident Address _____

County _____ Date of Birth _____ Driver License # _____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

Donor's Telephone # _____

Donor's Mailing Address _____

City _____ State _____ Zip _____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. # _____ Expires _____

Print name exactly as it appears on credit card _____

Cardholder's Signature _____ Date _____

Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: ___ ___ ___ ___ ___ ___

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
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Signature of Applicant or Donor _____ Date _____

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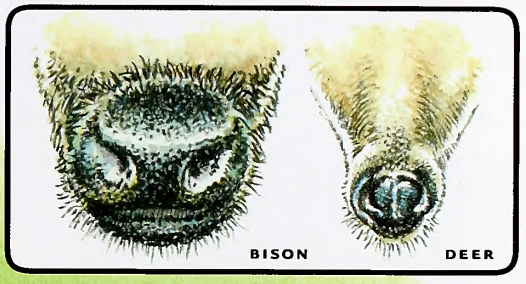
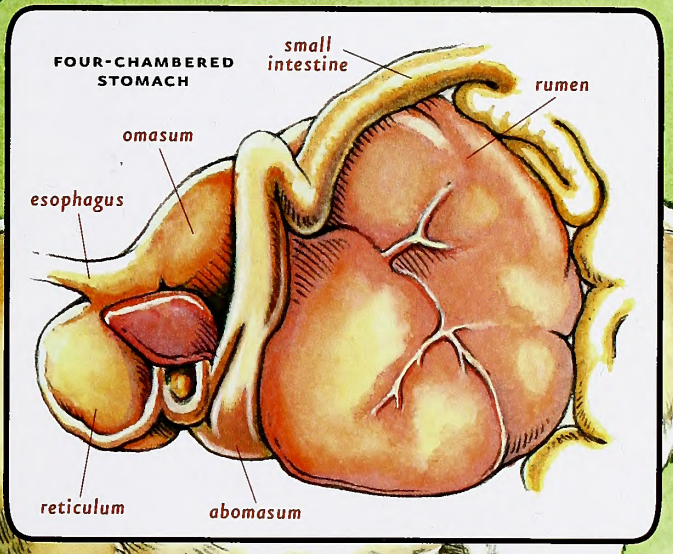
How Do Deer Digest Their Food?

written by Clyde Sorenson
illustrated by Jim Brown

WHITE-TAILED DEER LOVE HIGHLY DIGESTIBLE and energy-rich acorns when they can get them, but they make their living most of the year eating other kinds of vegetation containing energy and nutrients much harder to harvest. Deer have a highly specialized digestive system that allows them to exploit these foods.



Deer are browsers rather than grazers, meaning that, rather than mowing vast quantities of very-hard-to digest grasses with a broad, powerful snout, they select smaller quantities of more digestible forbs and leaves with their narrow, precise muzzles.



A deer has a four-chambered stomach to process the vegetation it eats. The largest chamber is the rumen, which receives the swallowed food. This chamber is basically a fermentation vat, where the food is mixed with saliva and processed by millions of microbes living there. (Since deer are browsers, their rumens are comparatively smaller than grazers'). The second chamber, the reticulum, is basically a pocket of the rumen. Deer vomit up packets of the rumen contents, called a "cud," to further degrade the vegetation by additional chewing.

Fermented and processed food moves from the rumen into the omasum, where water and minerals are absorbed. From the omasum, the now highly processed food moves to the abomasum, the true stomach of the animal which functions much like our stomach. From here, what is left passes in to the small intestine, where nutrient absorption is completed.

Renewal at Mattamuskeet

written by Jim Dean

Well before dawn last January, our headlights cut a yellow swath through the fog on the gravel road as we drove to the Mattamuskeet National Wildlife Refuge headquarters to check in with other waterfowl hunters who had been fortunate enough to draw one of the lake blinds.

JIM DEAN

Despite limited visibility, it was obvious that a big project was under way. A massive excavator sat just off the road, and a new berm of black earth followed the canal alongside the road.

After the hunt, full daylight revealed that several miles of the badly silted main canal in front of the old central pump station had been cleaned out. Was it possible that the lake's extensive canals and impoundments were finally getting a little attention?

"Better than that," refuge manager Bruce Freske explained proudly. "This is only a small part of the work we've already completed, and more is planned. Pete Jerome, supervisor of National Wildlife Refuges in the Southeast, has stated that our goal is to return Mattamuskeet to its glory years."

"The annual survey revealed more than 267,000 ducks, with the most numerous being green-winged teal and pintails."

That would be a major accomplishment, one with significant environmental and economic benefits. Lake Mattamuskeet is North Carolina's largest natural lake, a shallow, 40,000-acre body of water that lies in the belly of Hyde County between Albemarle and Pamlico sounds. The lake and 10,000 surrounding acres became a National Wildlife Refuge in 1934 after attempts failed to drain it—and keep it drained—for agriculture. The pump station with its familiar smokestack (which resembles a lighthouse) was converted into a hunting lodge.

During its peak years, Lake Mattamuskeet was considered the goose-hunting capital of the world, with up to 131,000 Canada geese wintering on the lake, along with countless ducks and tundra swans. Controlled hunts were permitted in 36 blinds. Beginning in the mid-1960s, the annual goose population began to drop. Changing local agricultural practices played a role, and many geese also began to winter farther north. The refuge still attracts many ducks and swans, and some geese also still return each year, but Mattamuskeet's habitat has steadily deteriorated.

Currently, only 16 blinds are operated for hunting in a relatively small area on the lake, while the rest of the lake and the many huge impoundments on its fringes all serve the primary purpose of providing protected habitat for wintering waterfowl.

Significant investments in waterfowl habitat have never been high priorities, and even lower given the current economic situation. Fortunately, plans to restore the refuge have been in the works for years, and the needed funds began arriving annually in 2005.

"We didn't get any money for a long, long time, and this refuge needed some attention," Freske said. "Now we have two excavators so we can do our own work and maintain it in the future."

In addition to the nearly four miles of the main canal in front of the pump station, the Jarvis Canal and east and south rim canal at the MI-11 impoundment (on the northeast side of the lake) have been cleared. On the east side, the Waupopin and Lake Landing canals have also been cleared. On the west side, clearing has been completed on part of the Hodges and rim canals at the MI-2 impoundment. Clearing three miles of the Rose Bay Canal is next, and some interior canals will also be reworked.

New pumps to regulate water levels have been installed at the MI-2, MI-4, MI-5 and 6, MI-8, and MI-9 impoundments. Three more are planned at MI-7, MI-10 and MI-11.

The central canal running out into the lake in front of the pump station has been dredged, and a new boat ramp installed. A bridge high enough for boats to pass underneath will replace the old one. In addition, more signs will be placed in the lake to mark and help enforce the boundaries. A new refuge office will be built behind the present tin shop, and a new shop is under construction.

The old central pump station now belongs to the state, and the N.C. Wildlife Resources Commission has plans to eventually complete its restoration as an environmental and historical education center.

Waterfowl are already responding to the changes—the annual survey revealed more than 267,000 ducks, with the most numerous being green-winged teal and pintails. Waterfowl food plants are again growing well in the impoundments and also in the lake on flats exposed by the recent drought.

For over 40 years, we watched the sad decline, convinced that national priorities had forever abandoned Mattamuskeet. But now it seems likely that more waterfowl will be spending the winters here than anybody has seen in decades. And the fishing may again be outstanding in those canals.

Pinch me, somebody, it must be a dream.

JILL CALLAHAN

OUTDOOR MOMENT

Water strider

IN THE NOVEMBER ISSUE

MELISSA McGAW/NCWRC

PADDLING WITH A PURPOSE
The Stewards of Our Waterways hit the water weekly to remove trash from the rivers they navigate.

BEAR DOWN
Wildlife Commission biologists have gleaned an amazing set of data from black bears harvested by hunters.

A MOUTHFUL OF TROUBLE
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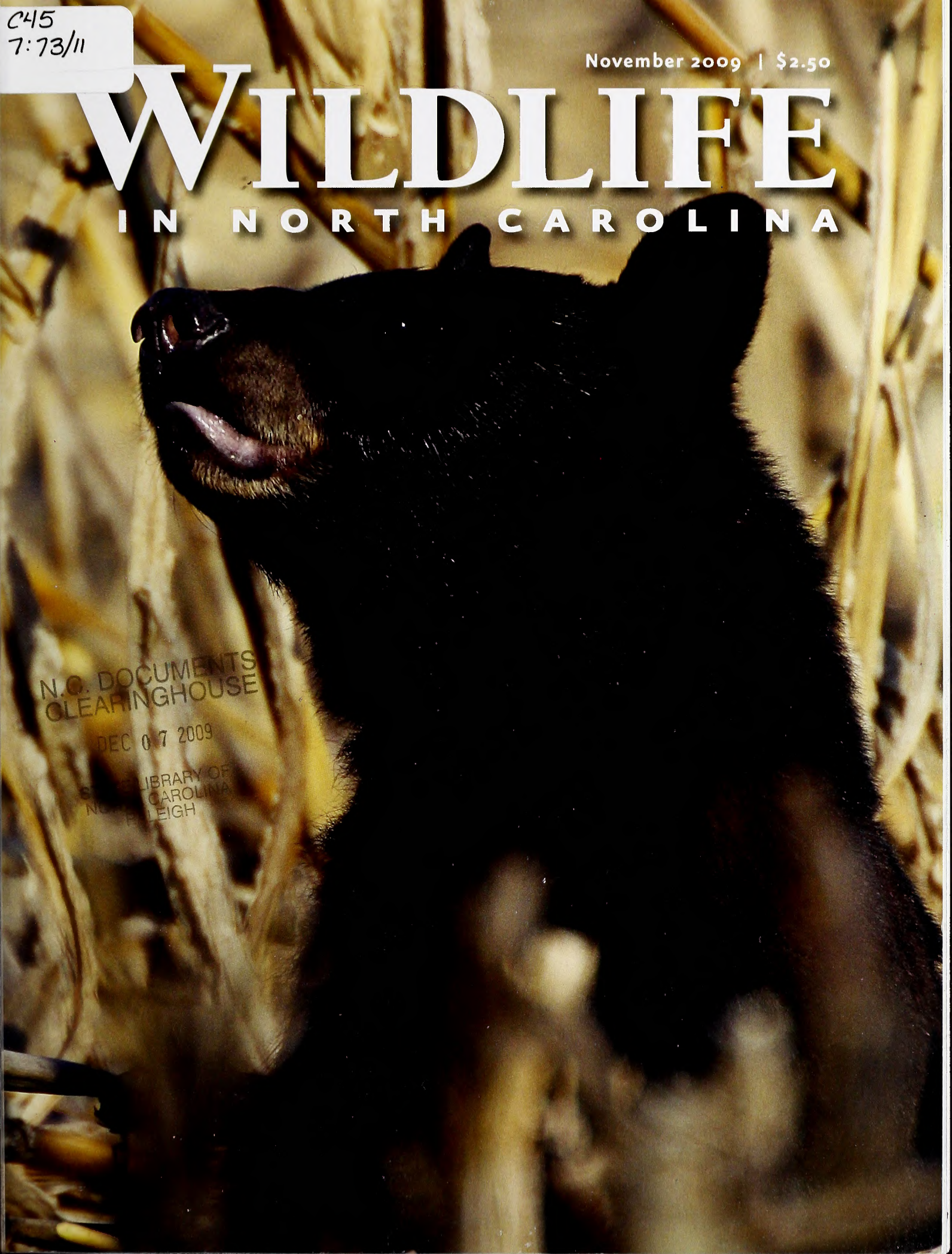

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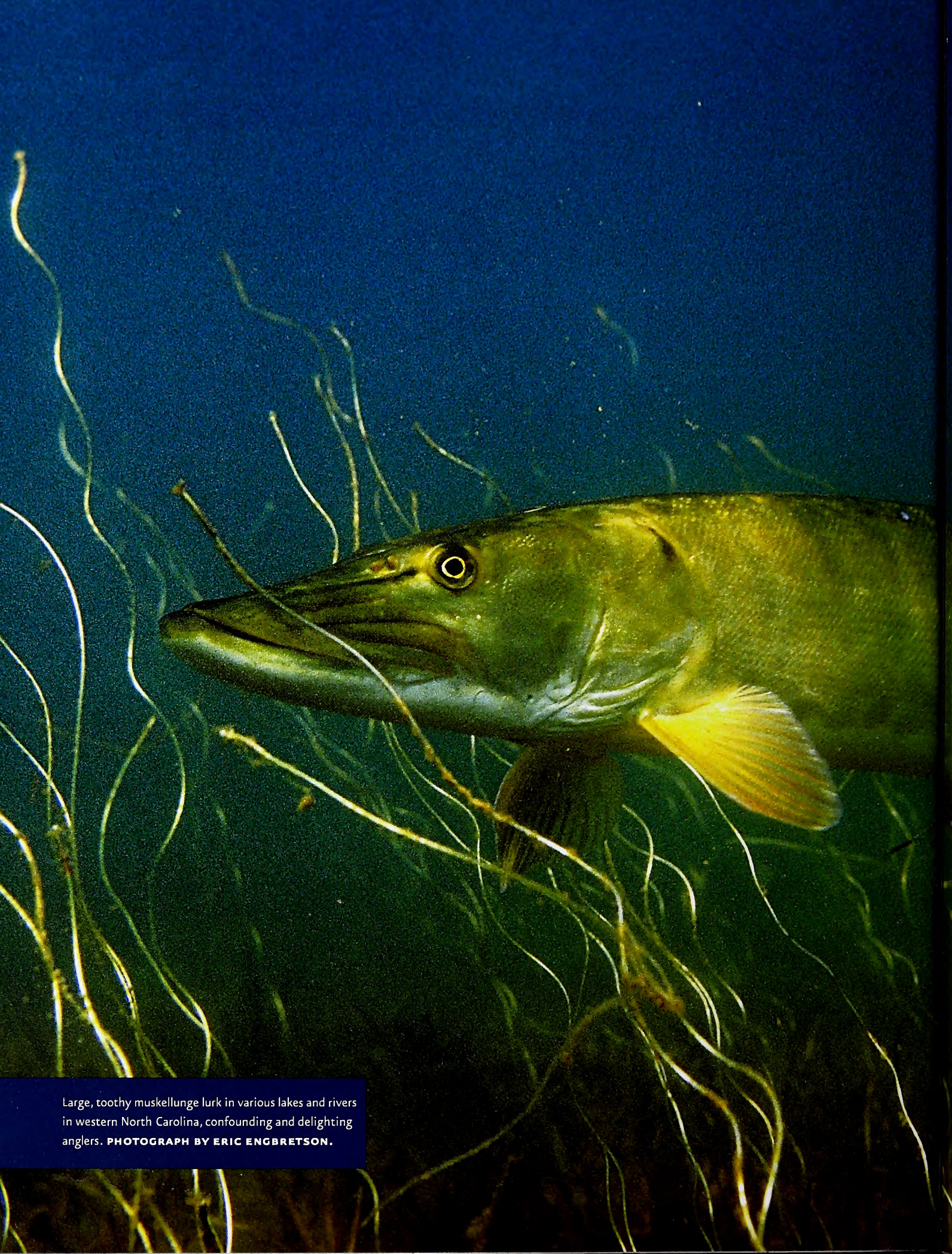
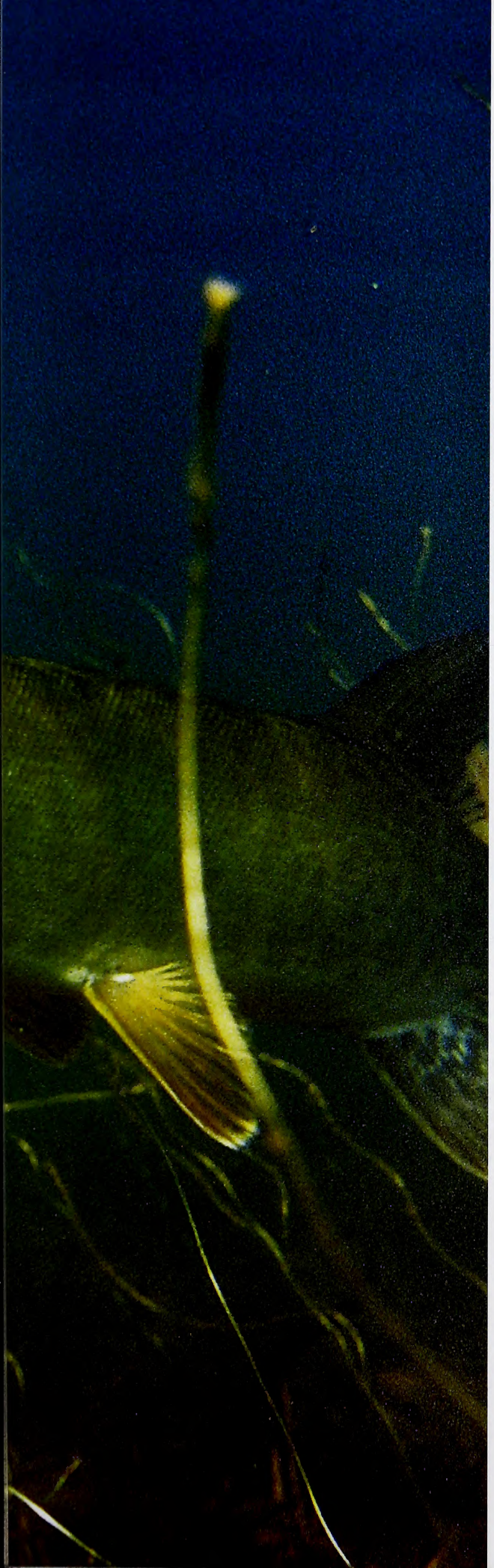


Large, toothy muskellunge lurk in various lakes and rivers in western North Carolina, confounding and delighting anglers. **PHOTOGRAPH BY ERIC ENGBRETSON.**



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Cover: Black bears like this one photographed in a cornfield at Alligator River National Wildlife Refuge are numerous thanks to sound wildlife management. PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

Our job here at the magazine can be described simply as collecting and distributing information on behalf of the N.C. Wildlife Resources Commission. We try to perform that task and present what we have learned in a way that is visually and intellectually pleasing. If we do our job well, our readers learn something while also being entertained.

Gathering and disseminating information is not just the purview of the magazine, it's a duty carried out by a lot of employees of the agency. Field biologists spend long hours collecting data, much of which goes into reports that are used internally for making decisions about wildlife and fish management. Especially interesting findings are presented to the public in a magazine article, press release or educational program.

One example is the Wildlife Commission's Black Bear Cooperator Program, which has assembled a set of data over the course of 40 years that is unrivalled among natural resource agencies. Mike Marsh's story "Bearing Responsibility" on page 4 details how the data collected led to management actions that have increased black bear populations.

Similarly, fish biologists with the agency survey populations of muskellunge, a large, tenacious, difficult-to-catch game fish in Mountain rivers and lakes ("Moody Muskies," page 26). They study whether various bodies of water can support reproducing populations of muskies, and adjust stocking plans accordingly to maintain sport fisheries.

Sometimes, keeping important information to yourself can result in a bad end. Long before he was associate editor of the magazine, Jim Wilson kept a secret about a misfire that happened while he was hunting. In his piece "A Sin of Omission" (page 20), he ruminates on how keeping that secret led to the shooting of his pointer-setter mix, Jo. Perhaps by sharing his tale, Jim will help other hunters and their bird dogs avoid the same fate.

The Wildlife Commission is dedicated to informing its constituents and the general public about issues concerning wildlife and wild places in the state. To streamline that effort, the agency has started N.C. Wildlife Update, a periodic e-mail newsletter containing up-to-the-minute information about conservation, changes to hunting and fishing regulations, boating access and dozens of other topics that are important to you. To receive the update, simply visit www.ncwildlife.org/enews and sign up.

Greg Jenkins

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Yours in conservation,

Gordon Myers, Executive Director
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Being Uncle Bill

am a native Long Islander who is hoping to ne day retire to North Carolina. I have been eceiving *Wildlife in North Carolina* for a number f years. This month I read "Mentoring for lunting's Future" (Aug. 2009) by Walter "Deet" ames and realized I am "Uncle Bill." Talk about n article that is right on the money.

I have a hunting camp in upstate New York's atskill Mountains and every year my son and half dozen friends come up for opening week f the deer season. Several years ago my grand- on Jordan wanted to know when he could tart coming up to hunt. This led to a fall veekend of target shooting with air rifles and lot of teaching gun safety, a little bit of cook- ng and cleaning in camp, some skeet shooting nd even a little turkey hunting. The weekend vhich started with three boys and their fathers nd one grandpa has become an annual event. Ve have also brought the boys along on some uck hunting trips on Long Island, and they love :. The only Christmas gift my grandson asked or last year was a duck call, and by January he alled in a flock of mallards to our decoys.

Uncle Bill and everyone who mentors are ot doing it for nothing. We expect to get paid, nd I recently got mine. My daughter-in-law alled to tell me that while waiting for me to ick him up to go fishing one day, my grand- on told her, "I think I am very lucky to have ıy grandpa."

Bill Chelius
East Rockaway, N.Y.

Courtesy Pays

David Hart's article "Finding a Place of Your Own" (Aug. 2009) gave excellent advice on finding land to hunt deer in this era where such opportunities are dwindling. I have found that if you are courteous to both the landowners and your fellow hunters and impress upon them that you are highly safety-minded, doors will open for you. By telling acquaintances I have passed up shots on deer because my bullet might travel into a residential area, I have gained their trust and was invited to hunt their property near my home. I have taken a dozen deer off their land, and they enjoy the jerky and steaks I share from my harvest.

Last year while scouting before deer season, I ran into the owner of the adjacent property. I told him of the joy I had in hunting nearby. I also mentioned that I prefer hunting from tree stands in that area since there are residences close by. He surprised me by inviting me to use his stand on the next hill, and to set up another one of my own.

Hunting on private property is a privilege given by the owners. Be courteous, show that you are serious about safety, and be willing to share the bounty with them.

David Snyder
Efland

Wading Revealed

I, like many others, think Jim Dean's column is the highlight of every issue. I'm 68 and my subscription doesn't expire until 2100. I'm making every effort to stay alive long enough to read Jim's column in that last issue. Over the years his column has given me moments of hilarity and frequent occasions for deep thought and reflection. I think one sentence in "Terrarium Trout" (Sept. 2009) excelled on both counts.

When I read Jim wrote that he "decided to wade wet, wearing only my wading shoes." I was first struck by the mental image of Jim stalking up the mountain, fly-rod in hand, naked as a jaybird, after those brookies. After I slapped myself upside the head to jar that vision from my mind, the deep thinking started.

We all know fly fishermen can't operate without numerous fly boxes and a plethora of assorted gadgets. Where does one store all that plunder when all one is wearing is a pair of wading shoes? Thanks for a great magazine.

Claude Davis
Reidsville

Jim Dean: As you observed, Claude, my choice of words was unfortunate, and the image it conjures is truly scary. No, I've never fished in the nude, but there is an old photo taken in 1978 on Wilson Creek that shows me and some fishing buddies sitting buck nekkid on a rock taking a wee nip after celebrating an unseasonably warm Opening Day with a quick skinny dip (quick because the water temperature was 52). Thanks for reminding me that I need to burn that photo.

Powerful Clarification

"How to Love a Dove Shoot" (Sept. 2009) contained a paragraph that has been misconstrued as encouraging an unsafe activity:

"Power lines, hedgerows and points of woods that break up the rectangular outline of a field are great places, because doves often route their flight paths along unusual structure. They'll often land on power lines before actually dropping down into a field to feed, and savvy hunters take advantage of this habit by placing hunters along the power line, even using a rod and reel to cast plastic dove decoys over the power cables to attract live birds."

It is never a good idea to throw fishing line or any other type of rope or string over power cables. The threat of electrocution is always present when using power transmission lines improperly. The preceding paragraph was intended to illustrate the methods that some hunters use, not to encourage them. We regret that we did not communicate that message well.

When hunting near power lines, never touch them with your hands or anything else. Also, if you choose to hunt near power lines, be certain that you do not take any shots in the direction of the cables or towers.

write us

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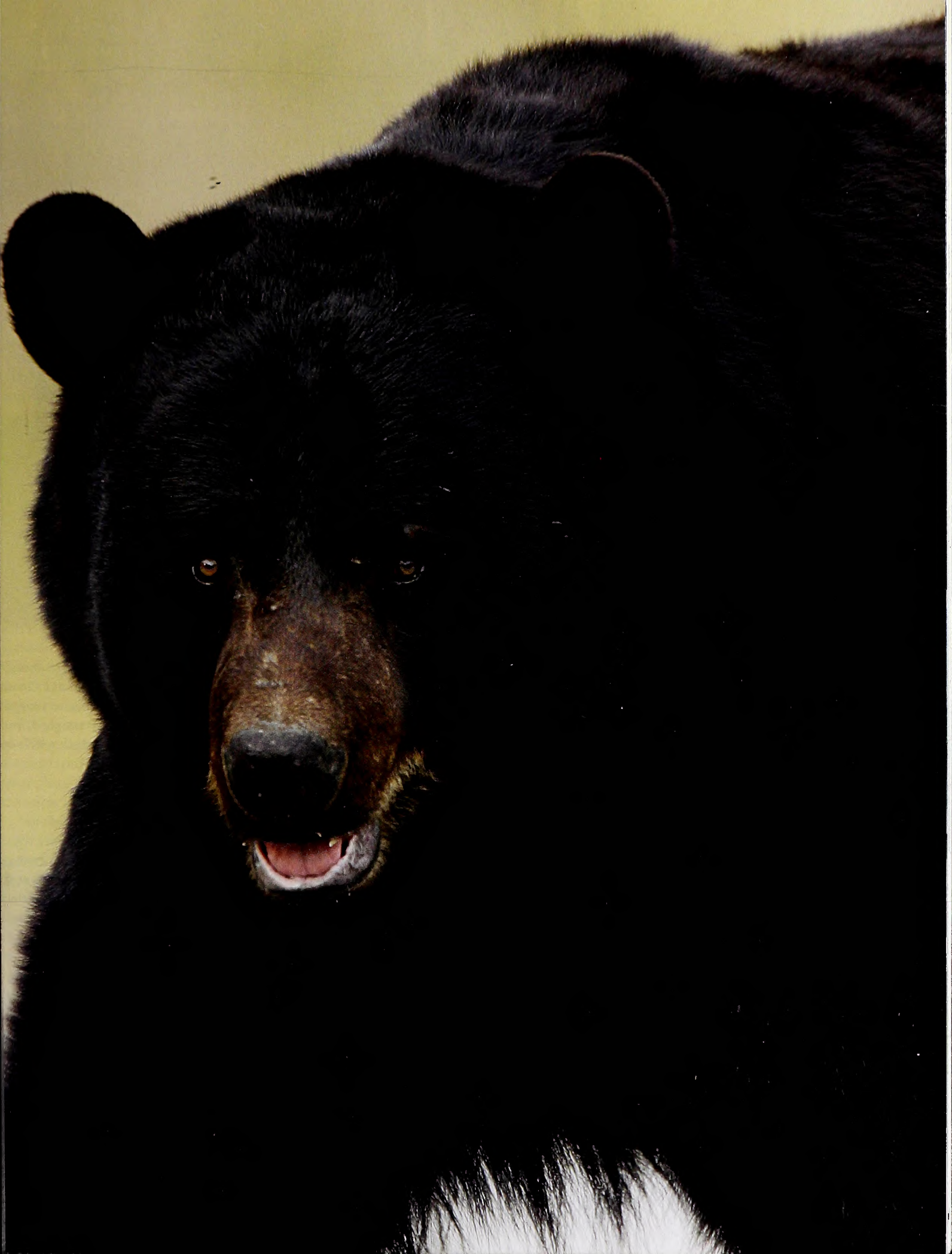
Working hand-in-hand with conservation-minded hunters, N.C. Wildlife Resources Commission biologists work through the agency's Black Bear Cooperator Program to ensure that black bear populations remain strong throughout the state.

RESPONSIBILITY

Written by Mike Marsh
Photographed Todd Pusser

Black bears were once considered to be nuisance animals. The largest predators in the state, bears caused severe damage to crops and orchards. They also occasionally took pigs, calves and other livestock. Back in those days, a farmer or settler figured the only good bear was a dead bear.

But the turnaround in the status of black bears has been absolutely remarkable. Although bears are still the culprits in a large number of nuisance complaints, occurring mostly in the mountains where new subdivisions are cropping up inside bear strongholds, they are now the state's premier big game animal. The restoration of the bear population to a status envied nationwide has come through teamwork between the technicians and biologists of the N.C. Wildlife Resources Commission and North Carolina's hunters through the Black Bear Cooperator Program.

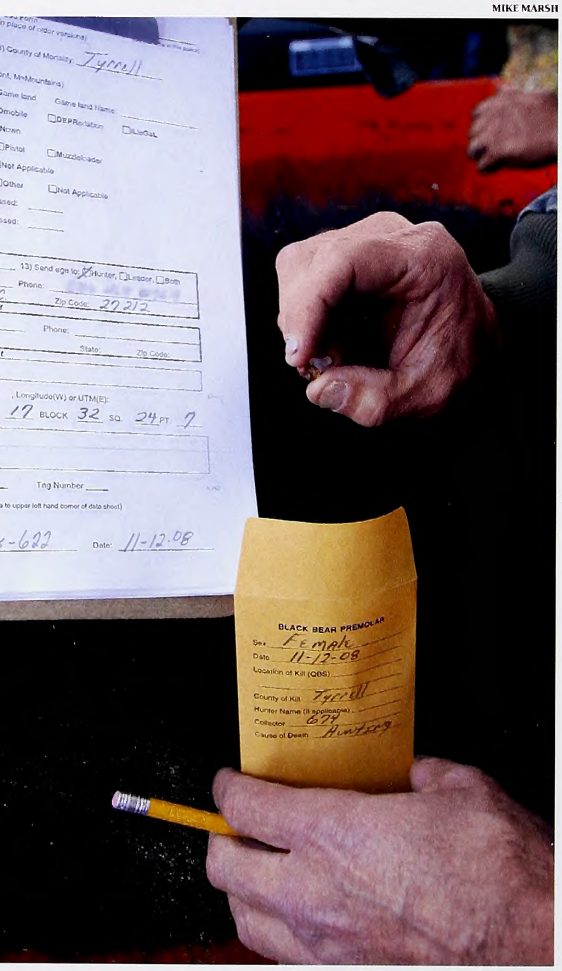


Hunting of a Different Sort

Dale Davis is the Wildlife Commission's northern coastal management biologist. Like many others in the commission's wildlife management staff, he was looking for hunter-harvested bears during the first week of one of the coastal region's 2008 bear seasons. The state has six different bear seasons occurring in various clusters of counties. The bear seasons are based on the data that biologists like Davis have collected from hunters in the field.

MIKE MARSH

MIKE MARSH



"During the first week of any bear season, whether it's in the mountain or coastal region, Wildlife Commission staff are in the field visiting hunters with their bear harvests," Davis said. "We have a number of ways of contacting hunters, and they also contact us. The bear line is open during the first week of any bear season."

The "bear line" or "bear hotline" is the Black Bear Cooperator Program's communications link. Through a cooperative agreement with the commission's Division of Wildlife Management and its Division of Enforcement, during the first week of any bear season, any hunter harvesting a bear can call the toll-free wildlife violations reporting telephone number of 1-800-662-7137 to request assistance in having biological information collected from the harvested bear. The Enforcement Division's dispatcher relays the call to personnel in the Wildlife Management Division, who in turn contact commission field staff via mobile phone.

Where once radio communication was used to relay the information, mobile phone service is now the norm, because most areas of the state, even remote mountains and coastal swamps that form the core of bear range, have transmitter towers for mobile phone communications.

In addition to this system, hunters may also directly call the Wildlife Management office in Raleigh at (919) 707-0050 during one of the seasons to let field staff know when biological data can be obtained. Davis explained that though some hunters contact him directly, others have used former hunter-check stations for so long that they still take their bears to those locations for the convenience of management staff.

"We divide opening weeks of the bear seasons into different days for each staff member who is working the Black Bear Cooperator Program," Davis said. "I'm working today [Wednesday], taking the place of someone who worked bears yesterday and the day before. Either I or someone else will work these same counties on the remaining days of this opening week of the bear season. Rotating our management staff allows us to maintain the continuity of our other management activities. Hunting season is always a busy time of year for us. But sampling hunter-harvested bears is given an extremely high priority."

Bear hunters were having good luck, and calls were coming over Davis' cell phone. Some of the calls were referred to other commission staff members when a quick consultation revealed they were closer to the harvest sites than was Davis. But Davis continued to drive through his designated area in Tyrrell, Bertie and Washington counties, traveling through territories frequently visited by bear hunters, including several commission game lands. Davis received a telephone call directing him to his first site. But another staff member, Migratory Game Bird Coordinator Joe Fuller, was already finishing with the bear.

"This was a big male bear," Fuller said. "I've extracted both premolar teeth and weighed the bear. It weighed 540 pounds."

The hunter was Tracey Conner of Creswell, who was hunting with her friend Troy Sutton. She had stalked the bear after spotting it in a farm field.

"I've been bear hunting for seven years, and this is my first bear," Conner said. "I was happy to have the biologists come to see my bear. Now I know how much it weighed, and I know the information they collect will help them manage bears."

Fruit of Their Labor

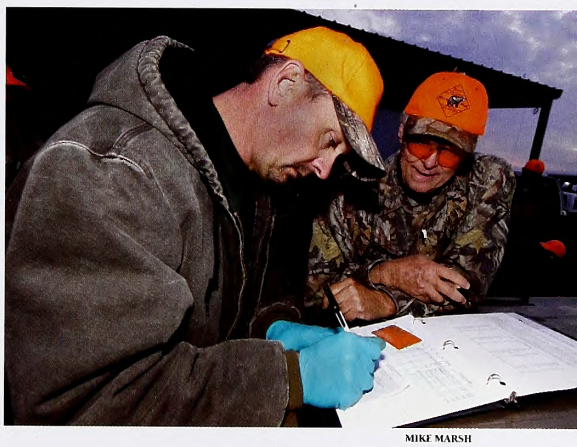
Management has different definitions to different people. On the one hand are the hunters, who want to maintain a high enough bear population density to provide them with good opportunities for success. On the other hand are landowners and farmers such as Archie Spear, the owner of the land where Conner harvested her bear.

"I'm glad to have bear hunters like Troy and Tracey," Spear said. "Bears are getting kind of thick around here. That's a big bear, and he got that big by eating corn, soybeans and wheat. That's one bear I won't have to feed anymore."

Davis received another set of directions to a harvest site and contacted the hunters via mobile phone. After a 45-minute drive, he wound up at the hunting camp of Culley Wilson of Wild Wing Adventures Guide

The state has six different bear seasons occurring in various clusters of counties. The bear seasons are based on the data that biologists have collected from hunters in the field.

MIKE MARSH



MIKE MARSH

Opposite page: Biologists remove both premolars from harvested black bears for further study, and record all pertinent data on the bruin. Above: Data collected includes each bears' weight and full contact information for hunters taking part in the cooperator program.

Service. "We had a good hunt this morning," Wilson said. "Several bears were seen. But most of the hunters decided to wait for bigger bears."

One hunter who had waited long enough was Steve Hurd of Burlington. After congratulating Hurd and Wilson and exchanging other pleasantries, Davis received permission to sample Hurd's bear.

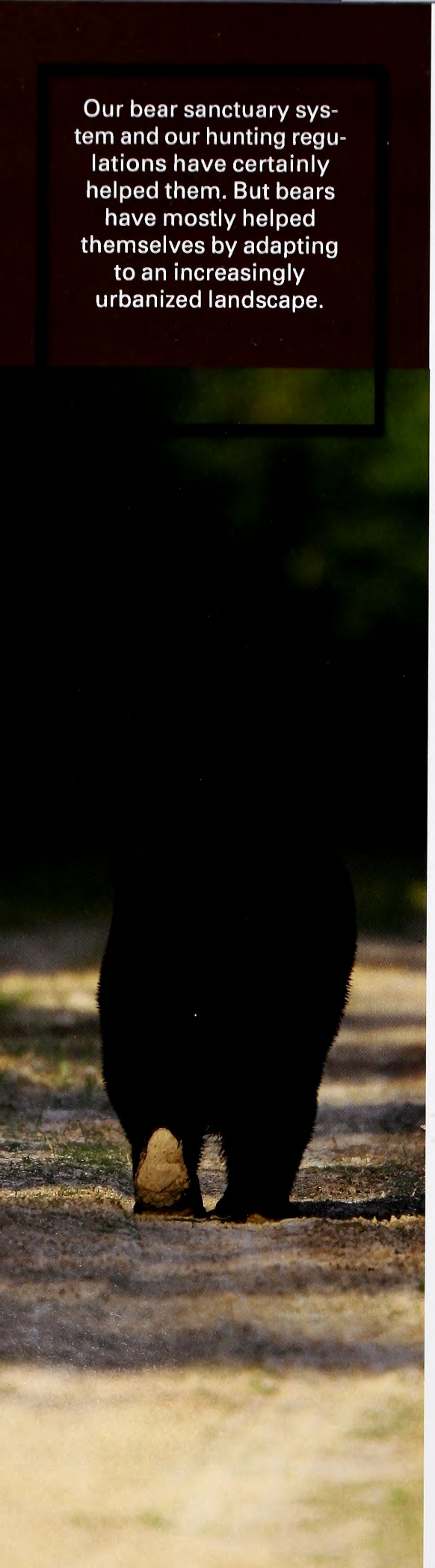
"I've known Culley for a long time," Hurd said. "I've always wanted to do a bear hunt. It was my third day in the same stand overlooking a cornfield. I saw one bear yesterday, but I considered it too small. I watched it for an hour and 15 minutes. It was bigger than this one and probably weighed about 350 pounds. But today was different. Rain was forecast, and I knew it would be my last chance for this year. When I saw this one today, I decided to take it."

Hurd's bear was a female. Davis backed his pickup truck near the bear. The bed of the pickup held a frame and hoist. Davis used a hand winch to lift the bear off the ground and weigh it on a scale. The bear weighed 280 pounds. Davis then removed both premolar teeth from the bear and placed them inside a small envelope with the identification information for the sample written on the envelope. Next he performed field surgery on the bear and deftly removed the bear's reproductive tract. The reproductive tract was placed in a bottle of liquid preservative. Davis wrote identification information on a label on the outside of the bottle.

Davis had a clipboard full of Bear Cooperator forms. He filled out a form for the sample, including the information gathered from the bear, the county of the harvest, whether the method of hunting was dogs or still-hunting, and the name and contact information of the hunter.

"Anyone who harvests a bear and allows us to sample it receives a North Carolina Black Bear Cooperator cap," Davis said. "We mail the cap to them, along with information about the bear. The information we send to the hunter includes the age of the bear, which we receive from a laboratory that examines the premolar teeth. The reason we extract both premolar teeth is that sometimes examination of one tooth is inconclusive, or one of the teeth might be damaged during extraction."

"I've always wanted a Bear Cooperator cap," Hurd said. "They are really nice hunting caps."



Our bear sanctuary system and our hunting regulations have certainly helped them. But bears have mostly helped themselves by adapting to an increasingly urbanized landscape.

In the past, cooperating hunters were given a fully camouflaged cap or a T-shirt. But hunters showed such a preference for the current style of cap that it is now the reward they receive.

"It has a camouflage bill and a hunter orange top, with 'North Carolina Black Bear Cooperator' and a bear inside a diamond, similar to a bear sanctuary or game land sign," Davis said. "It's almost a mark of honor for a North Carolina bear hunter because the only way to get one is to earn one by cooperating with the commission to further our management goals for black bears."

Davis received another call, sending him to a group of hunters who were hunting with hounds and had taken a bear in Hyde County. They had transported it to a closer location where Davis could meet them.

The successful hunter was Jim Copland of Burlington. Copland was already wearing a Bear Cooperator cap when he helped Davis weigh his bear, a 280-pound female.

"I've taken 16 black bears in North Carolina, other states and Canada, as well as a Kodiak brown bear and a grizzly bear," the 68-year-old Copland said. "Bear hunting is one of the most exciting sports in the world. To ensure the future of such a wonderful outdoor pursuit, I'm always more than happy to have biologists like Dale Davis sample any bear I am fortunate enough to harvest. It wasn't that long ago when there weren't very many bears in North Carolina. Thanks to science and sound management, bears and bear hunting will be around for our children and grandchildren to enjoy."

Davis removed the reproductive tract and premolar teeth from Copland's bear as he had done with Hurd's bear. He then completed the form with the identifying information.

The Next Step

Colleen Olfenbuttel is the commission's bear and furbearer biologist. She receives, compiles and translates the bear harvest and Black Bear Cooperator Program information. "During the first week of any bear season, hunters who harvest a bear can call the commission's Enforcement Division's violations reporting line," Olfenbuttel said. "But our sampling continues throughout bear season. After the first week, some hunters contact our local biologists, who will make arrangements to sample the bears. But we also provide all the necessary materials to many hunters who know how to take samples themselves."

Once the teeth have been obtained, they are sent to a laboratory in Montana, where researchers cut the teeth into extremely thin slices so they can examine the growth rings inside with a microscope. The growth rings tell the age of the bear the same way the growth rings of a tree tell a forester the age of the tree.

Examination of the reproductive tract tells whether the bear is pregnant and often how many offspring she may have borne in the past. "We take the ovaries and fallopian tubes from female bears because they tell us two things," Olfenbuttel said. "Examination of the ovaries tells us whether she was bred the previous summer. Examination of the fallopian tubes will show a visible scar if she's reproduced in the past. Fallopian tube examination is not 100 percent perfect because the scars can fade over time. But usually, the presence of scars will give us an idea of her reproductive history."

Using these data, Olfenbuttel said, the commission has been able to track the age structure and reproductive status of the state's bear population as a whole. The information shows whether the population is increasing, stabilizing or possibly decreasing.

"We have models that give us an estimate of the bear population," she said. "The information obtained from bear hunters, through these models, helps us establish our bear hunting seasons. Except for foxes, bears have the greatest variability in hunting seasons of any game animal in North Carolina. Bears are slow reproducers, so their management is very different from smaller mammals such as rabbits and squirrels that have huge litters. Bears average having only two cubs every other year, so we have to be careful how we manage them. We don't want too much mortality or it could create a population decrease. We have been conservative in what we recommend to avoid overharvesting our bears."

Successful Approach

Since the Black Bear Cooperator Program began in 1969, up through the 2007 hunting season, 17,212 bears were sampled. Though the lion's share of samples comes from hunter harvests, approximately 10 percent have come from road kills. Olfenbuttel said the commission obtains samples from approximately 50 percent of hunter-harvested bears in the mountains and approximately 40 percent of hunter-harvested bears at the coast. Not only does this information help safeguard

NATURE'S WAYS

How Are Bear Teeth Adapted To An Omnivorous Diet?

See Nature's Ways, page 39.

the bear population, it could also be used to defend the state's bear hunting seasons in the event that anti-hunting groups were ever to challenge the viability of North Carolina's bear population, as has occurred in other states.

The bear data collected show the population and range of bears are still increasing in North Carolina, resulting in a new season in 2008 for Greene, Pitt and Lenoir counties. Olfenbuttel said 33 bears were harvested there during the 2008 hunting seasons.

"Based on the presence of breeding females in our samples, bears now occupy 45 percent of the state," Olfenbuttel said. "We estimate the coastal population to be 7,000 to 9,000 bears and the mountain population at 3,500 to 5,000 animals. Occupied bear range is estimated to be more than 10 million acres. When our bear restoration efforts began in 1970, there were only 4,000 bears occupying about 2.5 million acres. Bears have proven to be very adaptable to changes in the environment in North Carolina over the past 30 to 40 years.

"Our bear sanctuary system and our hunting regulations have certainly helped them. But bears have mostly helped themselves by adapting to an increasingly urbanized landscape. The biggest example is the gated communities in the mountains, where bears live among the houses. People who aren't used to seeing them complain of bears in garbage cans and bird feeders and eating pet food. People must learn to remove food sources so they can coexist with bears."

Room to Roam

The state's system of designated bear sanctuaries encompasses 392,446 acres. In addition, parks, watersheds, other state and federal lands, and private land where owners do not allow bear hunting create another 2,232,300 acres of de facto sanctuary within areas of occupied bear range that are considered to be bear habitat. "We have documented a bear sighting in nearly every county of North Carolina," Olfenbuttel said. "There's no breeding population in the Triangle area. But we recently had a bear killed by a vehicle at the Durham-Orange county line. Typically, these sightings outside occupied bear range are sightings of young males dispersing, searching for a female or a new home range."

Bears have come a long way, from being extirpated from most of their original range to occupying nearly half the state and now generating excitement with sightings that can occur almost anywhere. The state's hunters can be justifiably proud, tipping their Bear Cooperator caps to themselves for their role in this stunning achievement.

"The Bear Cooperator Program provides us with an enormous amount of information, and it's very cost effective," Olfenbuttel said. "If staff or a university tried to collect the same amount of data, it would likely cost hundreds of thousands of dollars.

"We spend about $100 to $130 per bear sampled, which I feel is a real bargain for the amount of information we learn about the bear population. Most of that cost is paid through hunting license fees and the federal excise tax on firearms, ammunition and archery equipment. Our hunters manage our bears at all levels. Without them, we would have to find other funding and other ways of conducting bear research."

Mike Marsh, a freelance outdoors writer living in Wilmington, is a frequent contributor to Wildlife in North Carolina.

Above: Whenever possible, the Black Bear Cooperator Program records information about bears killed on roadways. Below: Scientists with Virginia Tech are tracking black bears with GPS collars as part of a study to find out the animals' travel patterns. Hunters may harvest collared bears, but are strongly encouraged to take part in the cooperator program or at least call the number on the bear's collar.

Dynamic 90-year-old folk hero and anti-litter activist
ELMER EDDY
leads the group Stewards of Our Waterways
in its mission to clean up every shoreline within 100 miles.

The ADVENTURES *of the* WHITE OAK RIVER TRASH MAN

Written by ELIZABETH BROWNRIGG . *Photographed by* MELISSA MCGAW

AT least once a week, on the North Carolina canoeing and kayaking e-mail lists there is an announcement from some guy named Elmer Eddy. The subject line might be "This Wednesday: White Oak River" or "This Thursday: Southwest Creek." The announcement lists time, place, directions and suggested implements, such as clam rakes or chain saws. Every message concludes with, "We will, as usual, pick up all trash and litter as we paddle. Please join us if you can."

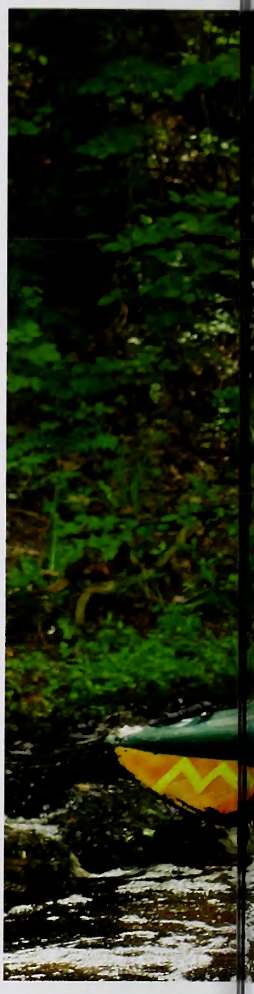
This is the account of a day I spent with Elmer Eddy and the Stewards of Our Waterways, and what I learned from them.

Bridges Are Popular Spots for Disposing of Trash and Carcasses

On a cold November morning, with the aid of Google and a state road map, I make my way to Maysville, and a little bridge on a back road that crosses the upper White Oak River. I am quite pleased with myself for finding the bridge. I wait with a small group of other shivering boaters until a van laden with bright red canoes arrives. Elmer, who is 90 years old, hops out and gives me a firm handshake.

Most of us have brought our own boats. Our collected modes of transportation range from short plastic recreational kayaks (the best kind for negotiating the narrows of this stream) to 17-foot sea kayaks to Elmer's red canoe with "Y'all Pledge . . . I Will Not Litter!" painted in white along the sides.

Everyone is issued a bright orange trash bag. We put in to the water and mill about near the bridge as we collect bottles, cans, paper cups and one television. We leave the two rotting deer carcasses. The lighter stuff has amassed in flotillas that we have to break apart. Some paddlers use clam rakes to nab the hard-to-reach items. People in smaller boats go after debris that's stuck far under bushes. As we meander downstream, the amount of trash slowly diminishes.



Trash accumulates around bridges on every waterway. Fishermen leave soda cans and bait buckets there, people dump household garbage there, hunters abandon deer carcasses there. In more heavily traveled areas, Elmer's biggest problem is that the Stewards don't have room to carry all of the trash they find.

There's More than One Way to Get over a Log

The sky is clear. The temperature is supposed to reach 50 degrees, but it hasn't made it yet. Every week, Elmer checks the weather forecast, picks the best day and paddling location, and sends out an announcement two or three days before each trip.

This section of the White Oak River is so narrow and shallow that it often doesn't hold enough water to wet a paddle; fall rains have brought it up to a navigable level. We twist and turn over riffles and around trees. A pileated woodpecker calls in the distance.

We encounter our first obstacle: A large tree has fallen across the width of the stream. Elmer and his co-paddler, Jim Niedermeyer, clamber out and straddle the tree so they can pull the big canoe over it.

Some of us opt for the assisted-portage method: Sherman Hawkins, a doctor from Goldsboro, and Doug Toltzman, a software developer from Hubert, are pulling boats over one end of the log near the bank. We step out of our canoes and kayaks and observe that the temperature of the river is best described as "bone-chilling." However, we can't feel very sorry for ourselves, because we hop right back into our dry boats on the other side, while Sherman and Doug remain standing in the hip-deep water until every one of us has gotten through.

This will not be our only obstacle. In many sections, the woods have been logged to within 50 feet of the water. Unprotected by surrounding forest, the trees are toppled by wind. Still, a few large old sentinels remain. The expanding arms of 700-year-old bald cypresses cast their benedictions to the sky.

Televisions Float

Before Jim and Elmer can get their canoe over the tree, they have to do something about that television they've been carrying. The set flies through the air to land with a splash on the other side of the trunk. TVs float! Who knew? We watch the TV bob downstream and worry about missing our soap operas until Scott Brown, a retired photographer from Morehead City, chases it down and ties it to the back of his kayak.

Then there's a bit of a kerfuffle as Jim and Elmer attempt to pull the TV into their canoe while it is still attached to Scott's boat, almost causing Scott to make an untimely exit. After some discussion, they cut the line, and Scott doesn't capsize after all.

In 2000, Elmer and his wife moved from Raleigh to Swansboro, on the White Oak River. Elmer started paddling right away and didn't have much trouble finding friends to paddle with. There was trash on the banks of their beautiful waterway. As Elmer says, "We didn't like the looks of it." Picking up litter became part of the journey. One thing led to another, and the group expanded its explorations to the rest of the White Oak River basin and then to the Trent River. The name expanded, too, from Stewards of the White Oak River to Stewards of the White Oak River Basin to Stewards of Our Waterways. Elmer has always been and shall remain "The White Oak River Trash Man."

The Stewards of Our Waterways clean-up crew varies week to week, as does the amount and type of garbage they find and remove.

ED GRUCA

Our motto is, 'If no one litters, there will be no litter.'

– Elmer Eddy

The Stewards' mission is to pick up every bit of litter on every waterway they travel. And to have fun.

Many of the Stewards are longtime members. Joanne Somerday joined six years ago when she moved to Kinston and began kayaking. She's younger than Elmer by decades, but those first trips exhausted her. Mike Banks, owner of White Oak River Outfitters, is the guy in front with the chain saw, buzzing through limbs and flagging the way with surveyor's tape. Jim Morris built his own one-man canoe. George Speth takes a break from his duties as a professor. Cliff Baker is the sweep who makes sure no one is left behind. Everyone brings handsaws, clippers and rakes, and everyone cooperates to pick up trash and clear the way.

It's impossible to separate work from play. Is it play to hack through unexplored waterways and shimmy your boat over beaver dams? Is it work to retrieve that shiny beer can from way under a blueberry bush or to fling a TV through the air? Is it work or play to make a shoreline pristine again?

Beavers Really Are Busy

The boaters leading the group give directions to the ones behind them: Stay to the left! Hard right! We start to encounter larger and deeper sections, which I optimistically take as a sign of the river widening, but which are actually caused by beaver dams. Beavers are overpopulated here because they have eight or nine pups a year and no natural predators. Some of their lodges are enormous.

As we encounter one dam after another, we hack a notch in the top so we can wriggle a boat through with a back-and-forth motion. The longer boats tend to get stuck and have to retreat to make a running start and acquire enough velocity to get over the top.

I'm getting pretty sick of the innumerable dams, but Elmer loves them.

"I take the time when we're doing it with a smaller crowd to get a real fast sluice," he says. "You shoot through there and it's a thrill. I like the beaver dams because the water's higher behind them. It makes a nice lake with pond lilies and beautiful flowers. It's a completely different ecosystem. You can canoe the whole river because it makes higher water."

We go through a grassy area where an alligator was spotted last summer. We pass under more big trees. The White Oak River is noted for its amazing collection of ancient bald cypresses.

Every log across the water is a new dilemma. Go under or climb over? Go around? It's hard labor pulling the boats over or hacking through.

After 8 miles, the sun is low in the sky and we're so close to the take-out bridge that we can hear trucks rattle over it. One last downed tree presents the largest impediment. Mike Banks chainsaws it and then has to leap out of the way and into the water when the tree collapses under him.

We emerge pretty much unscathed onto the bank under the bridge, although damper than when we started out. There's a large pile of mattresses and other flotsam on the shoulder of the road. Elmer posts a sign saying "Illegal Dump Site—Under Surveillance—Violators Will Be Prosecuted" at the trash pile and one that reads "Canoe Trail—Please Do Not Litter!" on the bridge.

Don't Mess with Elmer

Elmer counts heads, records the names and addresses of everyone who joins a trip, and makes sure we've all returned in one piece. In addition to his frequent e-mail communications, he maintains the group's Web site. The Stewards negotiate with local governments to get trash cleaned up, signs posted, waterways cleared for canoe trails.

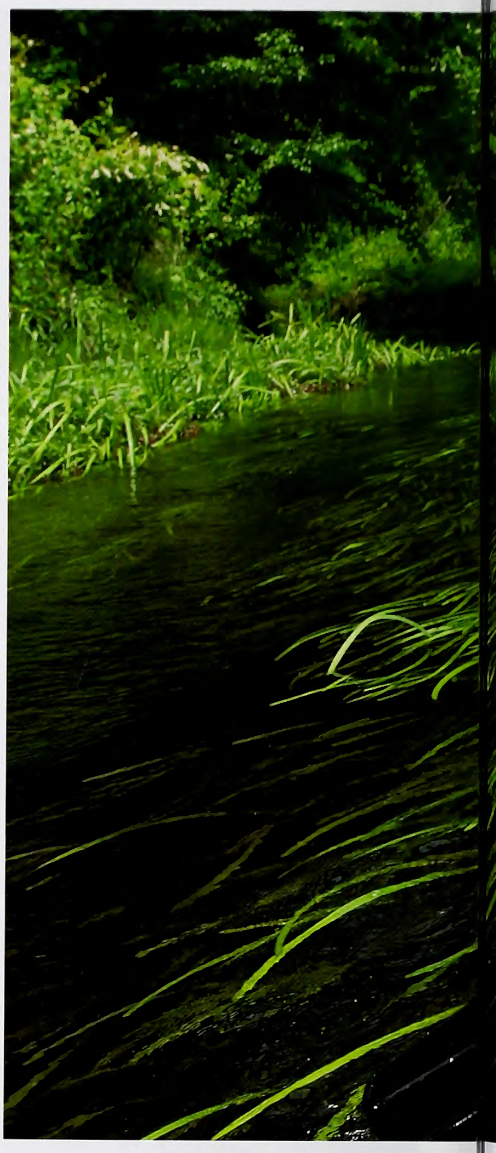
Elmer does not take "No" or even "Later" for an answer. I imagine that he's every bureaucrat's worst nightmare.

He is the change he wants to see in the world. "Every time we paddle, we pick up trash, and we think nothing of it," he says. "It's less and less when we paddle again in the same place. We can take you from Stella to Swansboro on the White Oak River and you don't see much trash. And we've done every tributary, too. Our motto is, 'If no one litters, there will be no litter.'"

Elmer Eddy and the Stewards of Our Waterways have received a number of awards for their work, including the Pelican Award from the N.C. Coastal Federation and the Outstanding Environmental Award from Keep Onslow Beautiful.

He's not done yet. His goal is to stop all littering. He's working on a proposal to require an "I will not litter" pledge with every new driver's license fee. Another goal is to paddle and clean up every foot of shoreline and every creek and tributary within 100 miles of Swansboro.

After our day on the White Oak, we stop at the Hardee's restaurant in Maysville for a cup of coffee. Elmer looks pretty happy.



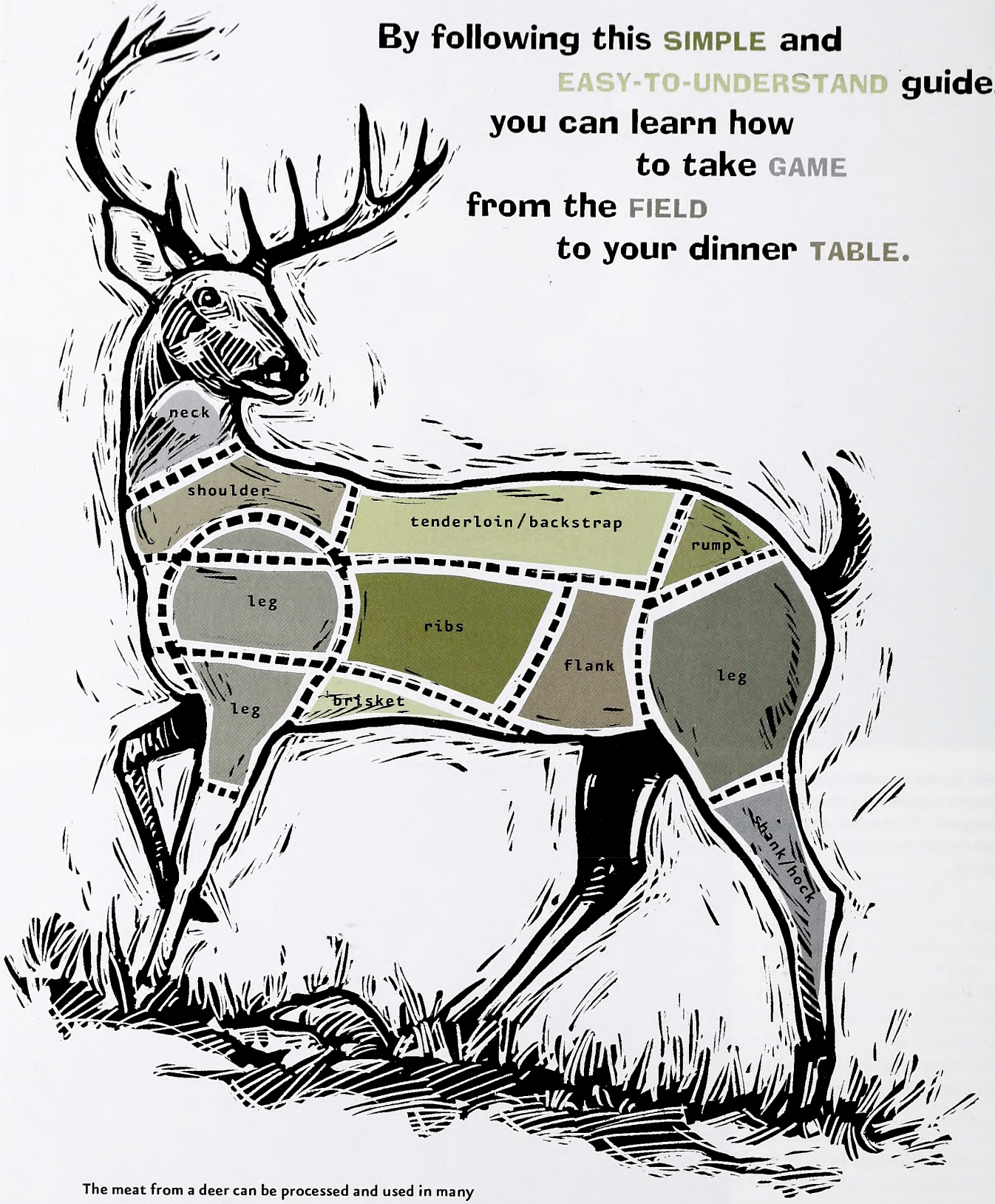
He says, "My doctor tells me, 'You start paddling twice a week. You need to do it to get away from the stress.' I'm the caretaker for my wife. I never feel better than right now after a trip, getting a good workout for the day and getting outside."

As the sun sets, we say our good-byes in the parking lot. A man spots Elmer's red canoe painted with "Y'all Pledge . . . I Will Not Litter!" and walks up to us. He's heard about Elmer Eddy and all that his group has accomplished. He says, "I used to love canoeing, but then I just got too busy with work. Can I join you sometime?" Another Steward is born. ◆

Elizabeth Brownrigg is a freelance writer living in Durham and an occasional contributor to WINC. *Check out the Stewards' new blog at http://waterwaystewards.blogspot.com. Join Elmer Eddy and his paddling crew on their next clean-up trip.*

Eddy says that his weekly paddling trips have eliminated stress from his life and made him feel great. A dedicated crew of volunteers makes the Stewards' mission possible.

By following this SIMPLE and EASY-TO-UNDERSTAND guide, you can learn how to take GAME from the FIELD to your dinner TABLE.



The meat from a deer can be processed and used in many ways, including steaks, chops, filets, roasts, jerky, stews, chili, soups, burgers and sausage.

VenisonTIPS

Written by T. Edward Nickens . Illustrated by Gary Palmer

This time, you've really gone and done it. You've actually killed a deer. It's in the back of your truck. Your neighbors are whispering among themselves. Your spouse looks at you with an expression that matches perfectly the question bouncing around in your brain: *Now what?*

What to do with a 140-pound pile of steaks, chops, bones, hide and hooves?

You could haul it all to a deer processor and return to pick up a cooler full of packaged this and paper-wrapped that. You could cram all those little white bricks into a freezer, crack open the door every now and then over the next few months and scratch your head and wonder: *Now what?*

Or, you could take four hours and butcher the deer yourself. The payoff: 12 months of the finest meals you could hope for. No guesswork about what's inside the package. It's not terribly difficult. Here's how to get started.

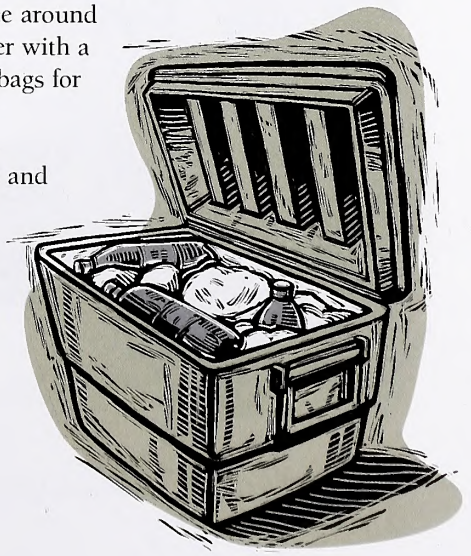
AGE A DEER IN A COOLER. Not all hunters have walk-in coolers, and a lot of us kill deer when it's still 70 degrees outside. Here's a way to age whitetails for four to five days even when you're wearing shorts in the back yard. All you need is a whopping big cooler and a supply of 2-quart juice bottles or milk cartons washed out, filled with water and frozen solid.

Step 1: Decide whether to keep the hide on or off. Keeping the hide on prevents some moisture loss, but you'll have to contend with hair on the meat due to quartering the animal with the hide on. If you skin the deer first, you can wrap the quarters in plastic wrap.

Step 2: Remove the tenderloins, which don't need aging as they are already tender. Saw off the front legs at the knees, then remove them at the shoulder joints. Remove both rear quarters in one piece by sawing through the backbone just ahead of the pelvis—you'll lose just a bit of backstrap. Remove the lower shanks. You're left with four pieces: the double hams, two front quarters and the rib cage and backbone.

Step 3: Place four to five 2-quart bottles or cartons of ice in the bottom of a large cooler; 160 quarts is a minimum size. You can use bags of crushed ice or small blocks of ice, but monitor water levels carefully and drain meltwater to keep it off the meat. Arrange the deer in the cooler—the double hams in first, then the rib cage. Work the front quarters around them. Now, tuck a few more cartons of ice in the space around the meat. Cover the cooler with a few blankets or sleeping bags for extra insulation.

Step 4: Monitor the ice and replace as necessary. A small whitetail will age nicely in a couple of days. Age larger animals for four or five days.



TAKE THE TENDERLOINS. These are the long fillets that run parallel to the deer's backbone, under the saddle. They are the most tender cuts and deserve the most tender care. They do not need to be aged. They do not need to be marinated. Here is what they need: a knife sharp as a wife's tongue during the last week of the season to remove them with a minimum of sawing back and forth.

They need a quick rinse. They need to go into a plastic baggie fast to prevent drying. And they need to be eaten within 24 hours of the kill. Not because they will spoil—they won't—but because the vagaries of life outside the woods will soon enough and certainly conspire to spoil that delectable memory of the moment when the wind and luck and pluck and the crosshairs all came together.

Otherwise, they need only be sliced into medallions, each one pan-seared in real butter seasoned with black pepper and rosemary, placed between an oil-packed sun-dried tomato and a fresh, butter-sautéed mushroom, and eaten with the fingers, without apology, while you stand over the stove.

backstrap

BONE OUT A DEER QUARTER. Boning out a deer quarter is quick and easy and results in five venison cuts void of bonemeal and marrow—top round, bottom round, rump, sirloin tip and shank. Get slicin'.

Step 1: Place the skinned hind leg of a deer on a sturdy table, with the outside of the leg facing up. Slice through the silverskin along the natural seam between the top round and the sirloin tip and pull the muscle away from the bone. Cut the top round off at the back of the leg.

Step 2: Remove the remaining silverskin. Cut the rump roast away from the top of the hipbone.

Step 3: Turn the leg over. Using your fingers, separate the bottom round from the sirloin tip at the natural seam. Cut the bottom round from the bone. Cut the sirloin tip from the bone.

Step 4: Slice the shank meat away from the bone and trim off connective tissue.

EAT THE HEART. Medieval nobles helped themselves to the finer cuts of the stag, leaving the "umbles"—the heart, liver and entrails—to the famished huntsman and other servants. Thus was born the term humble pie, but the expression does a disservice to a complex and exquisite meat—the fresh heart of the deer. It is lean, dense muscle. It is easy to clean and easy to prepare. You've been tossing it aside for too long.

Heart meat should be eaten fresh, within a day or two of killing your deer. To clean, split the heart in half and remove all veins, arteries, valves and fat. Rinse well under cool running water. Now you can simply slice the meat thin, dredge in flour, and fry it fast and medium rare.

Or give the heart the royal treatment: dice it into 1-inch cubes and sauté in butter with four strips of bacon and one diced tomato. Add ½ cup of water, ¼ cup of red wine and 1½ cups of peeled, diced onions. Cover and simmer for 90 minutes, then stir in ½ cup of sour cream. Season with salt and pepper to taste and serve over egg noodles for a meal fit for a king.

ROAST A HAUNCH. Poet and soldier of fortune Gervase Markham had this advice: "Stick it with Cloves all over on the outside ... lard it either with Mutton lard, or pork lard: but Mutton is the best: then spit it and rost it by a soaking fire, then take vinegar, bread crums, and some of the gravy which comes from the venison, and boyl them well in a dish: then season it with sugar, cinamon, ginger and salt, and serve the venison forth upon the sawce when it is rosted enough." Of course, Markham was writing in 1615 England, when larding the haunch of an ungulate was as common as thumbscrews, and six servants were assigned to the kitchen.

Here's an easier way: Cut the shank off the hind leg of a dressed deer and bone out the haunch. Stuff the bone cavity with a 50/50 mixture of diced dried cherries and toasted pecans. Tie it with kitchen thread. Roll it in a spice rub of 3 tablespoons each of ground cumin and brown sugar, 3 teaspoons each of ground ginger and garlic powder, and 2 teaspoons each of ground red pepper and Chinese five-spice powder. Roast it at 350 degrees until a meat thermometer reads 140 degrees (rare) to 160 degrees (medium). Slice it and bask in your own glory.

BACKSTRAP TLC. As originally designed, the *longissimus dorsi* muscles of the white-tailed deer allow wily bucks to leap sideways and vault vertically at the sound of a rifle or bowstring. Their higher calling, however, is to put a contented smile on the face of a hunter with a full belly. Hunters know these muscles as the backstraps. There are two of them, one each running along the spine from the shoulders to the hips. Besides the much-smaller tenderloins, which lie on the inside of the rib cage, this is the best meat on a deer. Too many hunters approach them with a dull knife and a cavalier attitude. Don't be one of them.

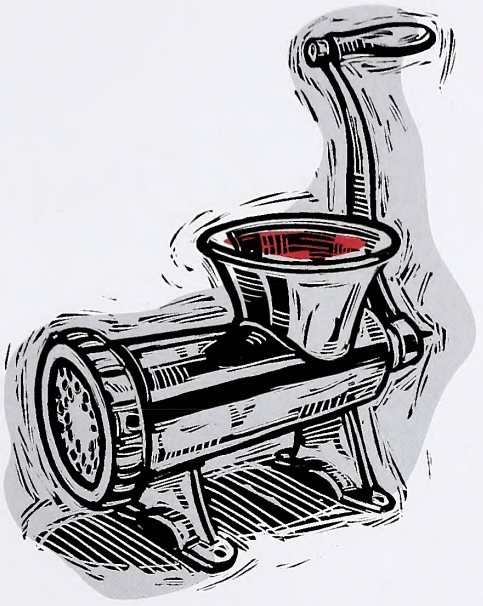
The best tool for the job is a short-bladed fillet knife or paring knife. The backstrap is attached to numerous bony humps on the vertebrae, and a flexible knife blade will work around them, ensuring that you waste as little meat as possible.

Start with an incision at the pelvis. Make a shallow, ¼-inch cut along one side of the spine, as close to the bone as possible, all the way to the front shoulders. Now, deepen

this cut all the way down to the ribs, being careful to pry the musele away from the spine while cutting. It's like filleting a fish; use the knife blade to feel the uneven surfaces of the backbone, and use your free fingers to pull the musele away from the spine. Next, start at either end and make a cut along the ribs, following the line of the rib cage, to meet the spine cut. The end of the loin musele should pull free of the rib cage. Grasp this free end and pull it away from the carcass. Now all you have to do is slide the knife blade along the seam between ribs and meat to free the rest of the backstrap.

Most hunters do a poor job of trimming. Don't slack off now. Starting at one end, cut off all fat and odd-grained muscle tissue. Trim away the tendons and silverskin using a very sharp paring knife. Wash it frequently. Once fat sticks to the blade, it's much more difficult to slide the knife between the meat and the silverskin. You should end up with one long piece of a single muscle, with no odd-grained parts. Freeze it whole or in large chunks, which will preserve moisture. You can slice it into steaks later.

To sample your handiwork immediately, try blackened butterflied backstrap. It's easy. Butterfly one freshly butchered venison backstrap (the smaller the better) into 2-inch-thick steaks. Brush a liberal amount of melted butter or margarine onto both sides of the



steaks. Shake Cajun spices on both sides of the steaks, nearly coating the exterior. Then place the steaks in a cast-iron skillet heated over an open fire until very hot. The meat and spices should smoke almost immediately. Cook two to three minutes per side, keeping the pan hot. Drizzle melted butter into the pan before turning the steaks.

GRIND YOUR OWN BURGER. The off taste in venison burger comes from fat, connective tissue, bone dust and marrow. The only way to get rid of it all is to get rid of it all yourself. After that, grinding your own burger is easy.

Trim like a madman. Use cuts no lower than the shanks, and trim as much fat, tendon and connective tissue as possible. The thin, flexible blade of a pointed paring knife slides smoothly between connective tissue and flesh. Wash it frequently to keep it from sticking.

Great grinding. Grind with the coarse blade. Electric grinders are easy to use, but a high-quality hand-cranker will still churn through 5 pounds of meat in a single minute, and they're a snap to clean.

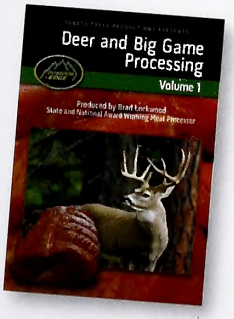
Hold the fats. Despite all advice to the contrary, do not add extra fat at the grinding stage unless you are positive that you want burger patties. Instead, freeze packages of pure venison burger and mix later, depending on the recipe, with binding agents such as ground chuck, ground pork, bread crumbs or eggs.

Armed with this knowledge, you should be ready to take your game from the field to your plate, involved in every step along the way. ◆

T. Edward Nickens is an editor-at-large for Field & Stream *and a longtime contributor to* Wildlife in North Carolina.

"Deer and Big Game Processing, Vol. 1"

For those looking for more detail, as well as a visual guide to the step-by-step procedures involved in processing your game meat, Outdoor Edge's DVD "Deer & Big Game Processing, Vol. 1" is an excellent choice.



Featuring in-depth, step-by-step instructions, this roughly three-hour DVD priced at $19.95 is intended to be an indispensable tool for the do-it-yourself hunter. In detailed steps, the DVD explores the nuances involved in caping, aging, quartering, deboning, grinding and packaging. Also, the viewer is shown how to identify primary muscles and the table cuts available from each musele group.

For more information, contact Outdoor Edge Cutlery Corp., 9500 W. 49th Ave., # A-100, Wheat Ridge, CO 80033; 1-800-447-3343; www.outdooredge.com.

–Mike Humphries

A Sin of Omission

The echo of an unrevealed hunting accident haunts a quail hunter's memory long after the sound of the shot.

Written by Jim Wilson
Illustrated by Joe Mahler

I never told anybody, not until now, but it was my fault my dad shot our bird dog. It was an accident, but it was still my fault. I didn't realize at the time I was to blame, that my sin of omission had brought Jo close to death one warm December afternoon at the edge of a cornfield in Granville County while I was off at college in Chapel Hill.

From the first moment I remember watching my dad reach into the game bag of his hunting coat and remove, one by one, half a dozen plump little bobwhites, I knew I would be a quail man. The realization was sudden and visceral, striking like true love or 190-proof liquor. This would be who I was. My dad handed me each bird, and I stroked their feathers. Each made good weight in my hand. He smiled when I pulled a bird to my nose and smelled it, inhaled that aroma of winter woods and earth and broom straw and decay, a fragrant essence hinting of wildness and cold and secluded dark places. What dog wouldn't relish putting his nose down into that gravy?

I love those birds, yet I kill them and eat them. How can you kill a thing you love? It is a mystery as old as human hunting, an ancient primal question.

Later, I walked in my dad's steps to the back of our yard, where the grass gave out and dark woods began, and watched as he gutted and plucked the birds. His fingers, sticky with blood and clotted with feathers, moved quickly over each one. My dad explained that the birds with the white throat patch and eye stripes were males, and that the females had buff-colored patches and stripes. When he removed their entrails, he held up heart, liver, gizzard and intestines like some pagan priest and named them before tossing them into the woods. He opened the crop of each bird and showed me the seeds inside: milo, soybeans, beggar lice and some unidentifiable weeds. Their crops were full; they had eaten well that day. We would eat well the next day.

From such beginnings—a rustic tableau once common between fathers and sons in the South—was born a lifelong obsession with bobwhite quail. It is a love that surpasses my comprehension. I don't try to understand it any longer; I simply accept that thoughts and images of quail hunting evoke something instinctive for me, something neither rational nor irrational. I suspect I am not alone in this sentiment.

Love and Death

I love those birds, yet I kill them and eat them. How can you kill a thing you love? It is a mystery as old as human hunting, an ancient primal question. Of prehistoric hunters anthropologist Wade Davis says, "Every day, you had to kill the thing you loved most, the animals upon which your life was dependent. It was the first mystery—and I would argue the basis of religion, which was an attempt to explain what happens after you die."

If you love quail, then you must love bird dogs. Pointers, setters and spaniels are the *sine qua non*—the "without which not"—of quail hunting. You can quail hunt without a dog, but it is a miserable, unsatisfying shade of a thing that's not worth the effort. It's like kissing a picture of your girlfriend instead of her lips.

My dad had brought Jo home a couple of years before I began quail hunting. She was a tiny,

delicate-looking black-and-white pointer-setter mix who, knowing my dad's frugal nature, was probably the runt of the litter, the dog least likely to succeed, a pup nobody wanted. I was happy to have her. My dad let me name her, and I chose Josie because of my fascination with a character in a book I was reading. (Actually, I was enamored of this fictional farm girl with brown hair and dreamed of bringing home to her a coat full of bobwhites. What she might ever do with them I never considered. The gesture, the moment of relinquishing something of value to another, was what mattered.)

Against the odds, including my dad's admitted shortcomings as a bird dog trainer, Jo became the best dog I've ever hunted over. She was birdy from the beginning and loved to hunt bobwhites, probably more than I did. In the field, she was quick but thorough, working best after being given free rein to disappear for about 15 minutes and scrub off some repressed energy. She was not a woman who would lie to you. If Jo said there were no birds in that strip of partridge peas, there were no birds in that strip of partridge peas. And if my dad or I called out, "Hunt up, Jo. Hunt up," because we thought she had been too hasty in her assessment of a birdy-looking spot, she would turn to the offender with a look of sad bemusement that seemed to say, "I'll do it, but it ain't going to make any birds come flying out of there."

By late afternoon, the end of her tail would be bloody from beating against brush and briers. I reckoned it her badge of honor, just as the scratched and bleeding backs of my hands were my badge of bird-hunting authenticity.

Often I hunted alone with Jo. I like hunting with others, but going alone also is good. Sometimes it's the best way. When I was 16, Jo and I were hunting, walking down the railroad track, our shortcut from a cornfield to a milo field. She was 50 yards down the track, and I was walking slowly, my shotgun held over my forearm and pointing toward the ground. Suddenly, I heard a bang and gravel scattered 6 inches from my right foot. I responded with every cuss word I knew at the time. I've since added considerably to my vocabulary.

Frantically, I looked at my boot to make sure blood wasn't flowing, but I was all right. I figured I must have absentmindedly slipped the safety and touched the trigger for the right-hand barrel. *I can't tell anybody about this*, I thought, *because I might not be allowed to hunt*. That was the important thing, the preservation of my hunting days. And so I immediately plotted a strategy of silence. I was unhurt, and no one would know what had happened.

Out of Mind

For several weeks the incident lingered in my thoughts whenever I picked up my shotgun, an aged Charles Daly 12-gauge featherweight, a gun that, if you weren't careful, would smack you harder than your mama when you misbehaved in church. Gradually, like so much that comprises our days, the incident faded from memory, and I no longer fretted over the fact that I had nearly—literally—shot myself in the foot.

Another quail season passed, another Thanksgiving and Christmas spent pursuing bobwhites with my dad and Jo. The three of us, and sometimes a neighbor or my brother, Sam, hunted hard into the winter, through January and February until near darkness on the very last day of the season. I loved the cold hunting, the rough, frozen fields, the dying sun glinting on broom straw and the slicing wind on my cheeks that sent snot running unchecked from my nose. Then came college, and our quail-hunting triumvirate was now but two on most days. I thought often of the birds and Jo and my dad as late autumn arrived and I struggled to accustom myself to living inside city limits for the first time in my life. I thought myself to sleep in those days by retracing our hunts, trampling from one covert to another in a piece of poor country where I longed to be. It rained without stop over most of Thanksgiving break, and the red fields turned to mire under dark, gray skies, and we did not hunt. Christmas, I thought, would be different.

My dad quit quail hunting after Jo died. I never asked why, but I think I understand now. I, however, was only 20 years old and eager to find a new dog, anxious to resume the hunt.

In early December, my dad and Jo hunted one of our favorite fields, the big one near the lake that often had corn or wheat planted in it, the one with the low area in the middle that most times had a few inches of standing water and occasionally contained a mallard or two. My dad killed one quail with a single shot on the covey rise, and Jo retrieved the bird. As she approached within a few feet, bobwhite in mouth, my dad, the side-by-side angled across his left arm, reached to take the bird. The gun fired, hitting Jo in the top of her neck and slamming back the gun's top lever, splitting the web of flesh between my dad's thumb and index finger.

Jo lay bleeding on the ground, her legs pawing the air as though she were running. My dad took off his hunting coat, wrapped it about her and carried her to the car and on to the veterinarian's office, where Jo was medicated, stitched and cared for. She slept on a hastily fashioned bed of old blankets on the back porch throughout her recovery, which eventually was all but complete. She was the lone dog my dad ever allowed in the house. Only a small scar remained where her coat did not grow back as it should have. She showed no disinclination to hunt, no fear of shotgun blasts. She was a bird dog; that was her life, and she would not be denied her nature or her pleasure.

It was a couple of weeks after the accident, with Jo still lying on the blankets and watching me with her dark brown eyes as I'd walk past, when my dad asked if I wanted to ride along to the gunsmith shop. "I want to make sure there's nothing wrong with that side-by-side," he said. "I know the safety was on; I can't figure out why it went off like that." After hearing the story of what had happened to Jo, the gunsmith began taking apart the shotgun. He held up a piece and said, "I'm sure you've got a weak trigger spring. I'm surprised it hasn't been a problem before."

Fault and Blame

That's when I knew: It was my fault. I should have figured something was wrong with the gun. I could have prevented the whole thing if I'd only confessed to nearly shooting myself in the foot. Again I remained silent. I felt too guilty, and so I added that to the secret list of things that I would not talk about. I would think about it, take it out and hold it up as an example of my many failures, but I wouldn't speak of it.

Jo lived to 13 years of age before she simply failed to wake one morning, the best way of all for a dog, or a man, to go. My dad wasn't so lucky. After surgery for a spot on one of his lungs, within nine months his doctors found that the cancer had spread to his brain. Even though he died within six weeks of his diagnosis, his was not an easy death. As the summer lengthened, my father lost the ability to speak and then to move. I could only watch as he became less and less of the man I had known, a shade of what he used to be when I was young and he schooled me in the pastimes of country boys, of hunting, fishing and baseball. As he lingered, I sat in his room and watched him slip toward death and cursed his dissolute and disinterested angels for failing to keep him safe. There was nothing I could do. I felt I should rest my hand on his or touch his gaunt, whiskered face, but I didn't. We are not a demonstrative family; we keep ourselves to ourselves. It is our way. He died alone in early morning darkness on a July day when the sun came up white and the air was dry and hot at first light.

In the days following his death, the most natural and comforting thought was of the three of us hunting. Jo holds point at the end of a brown field flanked on three sides by a catbrier and honeysuckle thicket. My dad approaches from the right, I from the left, and as we close, the covey erupts from the field stubble. We begin to mount our guns. I freeze the image while we remain in motion, as though holding that unfinished act gives them life everlasting. John Keats learned that 200 years ago after admiring a scene on a Grecian urn. I figured it out while picturing a Southern factory worker and a cheap bird dog hunting red clay North Carolina fields. That is the image of us I keep, the one I cherish.

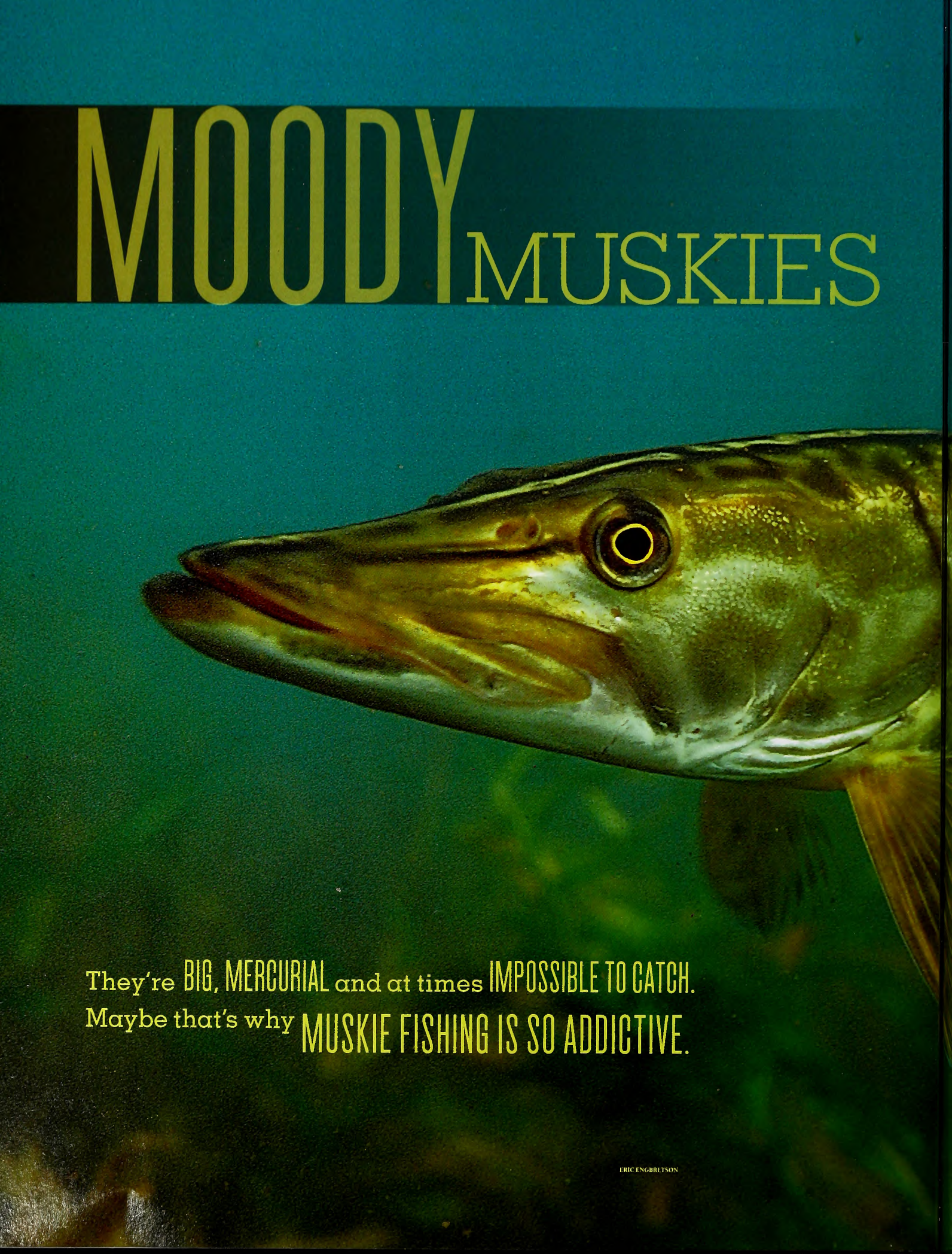
My dad quit quail hunting after Jo died. I never asked why, but I think I understand now. I, however, was only 20 years old and eager to find a new dog, anxious to resume the hunt. And hunt I did, although despite having a number of bird dogs, I never found one as good as Jo. Even today when I am quail hunting, I always picture Jo, her tail held high and bloody, her jowls quivering with the scent of quail on the ground.

I have a friend who says there is no always, and I myself am cautious of the word. It's an easy word, one often uttered without thought and empty of the forever it promises. But I know she is wrong. I believe in always; I always have. Always is a rare thing. You don't often have it within your grasp. You do, however, know it when you find it, and you'd best hold hard to it. Jo was an always kind of dog.

Decades after I failed to tell my dad of my accident, I still sometimes think of my negligence, usually on nights when I'm feeling I haven't measured up in some way to some self-imposed standard, when the ghosts of regret hover by my side and hiss aloud my failures in the darkness. I could have prevented harm to a man and a dog—my dad, my dog. I let them down, and they never knew. I'd like to apologize now, but there's no one left who would give a damn. ◆

Jim Wilson is the associate editor of Wildlife in North Carolina *magazine. Contact him at jim.wilson@ncwildlife.org.*

MOODY MUSKIES



They're BIG, MERCURIAL and at times IMPOSSIBLE TO CATCH.
Maybe that's why MUSKIE FISHING IS SO ADDICTIVE.

ERIC ENGBRETSON

Written by Marty Shaffner

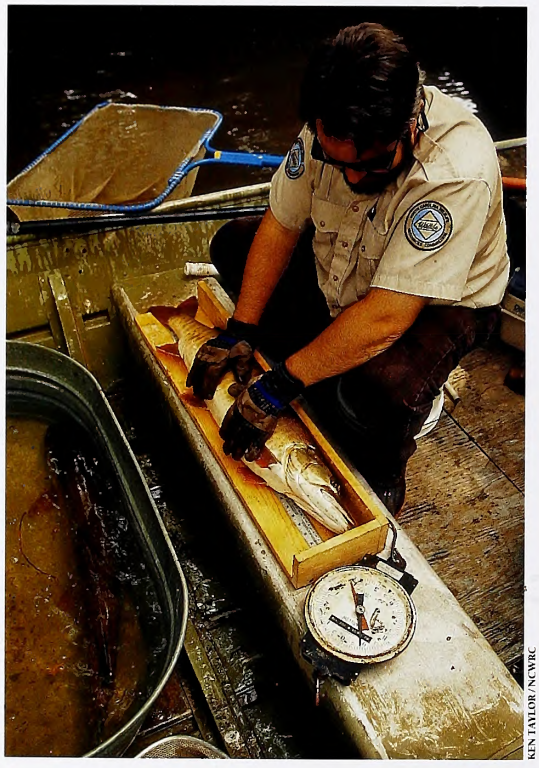
The buzzbait gurgled along the top of the water before it suddenly halted in a violent eruption of water. I quickly set the hook hard and knew I was into a big fish. As the drag slipped and screamed, thoughts of a 6-pound smallmouth bass raced through my mind, but they quickly vanished as a 40-inch muskie struggled to tail-walk across the water.

Too big to get its whole body out of the water, the muskie arched half of its body straight up, with the other half parallel to the surface. Using its tail like an outboard motor propeller, it pushed itself along the top while violently shaking its upper body before disappearing back into the water. As the fish moved toward the middle of the river, I applied all the side pressure the rod would bear, and the fish continued to peel off line.

Finally the pressure from the bowing rod and the drag from the reel turned the muskie from its run. As the fish began to swim against the current, I felt for the first time that I was in control. The muskie jumped once more, although not as impressively as the first time, and made another, shorter run before I was able to guide the huge fish next to the raft.

I was in awe of the third and largest muskie I had landed in the three and a half hours that my wife and I had fished on that gray, drizzly April morning. The fish was not only the largest of the morning but a personal best. We didn't have a tape long enough to measure it, but I had 40 inches marked on my raft, and my estimate was 45 to 46 inches in length, with a much larger girth than any muskie I had ever caught. We reached the boat ramp about 30 minutes later, and while strapping down the raft I reflected on the morning trip. Three muskies in less than four hours—sometimes I wouldn't even see three muskies in 10 trips, much less hook or catch three in a half-day trip.

F. EUGENE HESTER



KEN TAYLOR/NCWRC

Muskies can be found in a number of western North Carolina bodies of water, including the French Broad and New rivers. Wildlife Commission biologists, in addition to sampling muskie populations (above), stock fingerlings (near right) in waters where natural production is insufficient to fully support a sport fishery.

The Moods of the Muskie

Although I am not a muskie guide, I do guide for smallmouth bass and trout, and my home waters for smallmouth also are some of the better muskie fisheries in the Southeast. Those waters include the New River in North Carolina and Virginia, which is one of the premier muskie fisheries in the region. My clients and I usually will catch, hook or otherwise encounter muskies several times a year.

Muskies are undoubtedly the weirdest, moodiest fish I have ever encountered. I have come to realize there are three major modes of behavior muskellunge exhibit, and we'll take a look at them.

There are days when it seems there are no muskies in the river, even though you know they are there. You don't see them; they don't follow your lures to the boat, and they don't bite. An angler pays his dues on these days by casting for hours without any action. These slow periods are how the muskie got its nickname "fish of 10,000 casts" and also weed out the pretenders from the true muskie fishermen. This is what I call the neutral mode—when muskies sulk suspended in the cover of downed trees or hide in rock ledges located in deep holes. They can be caught at such times, but the odds aren't good.

Then there's the curious mood. You're retrieving your lure when you notice a large lurking form slowly following it about 3 feet back. As your lure gets to the boat, the big freshwater wolf doesn't bolt for cover or spook wildly, it just sits there finning, unimpressed with you or even your boat. If the water is clear, you will feel like he is looking at you, without fear, for a few moments before he slowly swims off or sinks back into the depths. The muskie may even decide your boat makes a good piece of structure and swim under it to hang out for a while.

Your only option to induce a strike when the fish are in this mode is a technique called the figure 8. As your lure approaches the boat, lower your rod tip about a foot or so into the water, and when the lure is approximately 3 to 4 feet from the tip of the rod, start sweeping the rod tip in a figure 8 motion. This erratic motion will sometimes trigger a strike, but in muskie fishing nothing is high percentage. This technique is successful often enough that a lot of muskie hunters perform it at the end of every cast, whether a fish is seen following the lure or not. An important word of caution: Keep a tight grip on the rod handle. A big muskie hitting a bait with 3 feet of line in the water generates a lot of force and can rip the rod out of the hands of an angler unprepared for the strike.

"Follows," as muskie fishermen call them, are what keep the muskie fanatics going. I recall one day while guiding for smallmouth on the New River we floated by a fisherman casting a huge jerkbait from the bow of his johnboat. We exchanged greetings as we passed and I asked, "Doing any good?" He replied with an excited but glazed look in his eyes, "I've had two follows," and after a pause of just a couple of seconds he added, "I caught one last week." After we had floated out of earshot, my clients said, "Had two follows all day, caught one last week. Muskie fishermen must be crazy." I replied, "It helps."

Ah, but, as the old saying goes, good things come to those who wait. There are days when muskies bite, and multiple-fish days are possible but still not common. Usually those days are marked by an approaching front and falling barometer. High, murky water also can trigger feeding responses. The day I caught that 40-inch-plus muskie had every good condition you could ask for. The April morning was dark and gray with overcast skies, and light sprinkles fell occasionally. A major weather front approached from the west and was expected to hit the area in the late evening. Another advantage was the water levels had risen in the early morning before daybreak, and the water was lightly stained. You could not have ordered a better set of weather and water conditions for muskies to become active and feeding.

What does all this mean? As my daddy used to tell me when I was a kid, "You can't catch anything if your hook's not in the water." Muskies can be caught at any time, anywhere they live, on any lure, but if you can be on the water during the weather or water conditions described above, be there. It will increase your odds tremendously, and when trying for the toughest freshwater fish there is, anything you can do to better your odds should be used.

North Carolina Muskie Waters

The N.C. Wildlife Resources Commission stocks fingerling muskies in waters where its biologists deem it suitable for them to live without compromising other indigenous species. The commission stocked more than

1,800 muskie fingerlings, approximately 8 to 14 inches in length, during 2009 in the French Broad, Nolichucky and New rivers as well as Lake Adger in Polk County.

Richard Dodd of Black Mountain holds the state record with a 41-pound, 8-ounce muskie he landed while trolling a Storm Big Mac lure at Lake Adger on Jan. 23, 2001. Lake Adger is the best muskie lake in the state, perhaps one of the best in the Southeast, even though development along its shoreline has damaged or destroyed some of the fish-holding structure around the lake. Downed trees and brush have been cleared around the shoreline where large homes have been built, destroying muskie cover. Lake Adger is still a great muskie fishery that has abundant forage fish such as shad, suckers and carp and produces North Carolina's largest muskies. The lake is stocked with approximately 250 fingerling muskies each year.

The French Broad River near Asheville is the premier muskie river in the state. This river receives the largest stocking of muskies of any state waters—650 fingerlings. This river routinely gives up trophy-sized fish of 40 inches or longer and has the highest

MUSKIE MANAGEMENT

The muskellunge (*Esox masquinongy*), or muskie, is native to eastern North America from Canada through the Great Lakes region and southward in the rivers of the Appalachian Mountains. Western North Carolina marks the southern extent of the range of the species. The unusual name of the fish reportedly comes from early French explorers' interpretation of a Native American word for "ugly pike." Most or all of North Carolina's original muskie populations were lost to pollution and habitat destruction during the 20th century.

In 1970 the N.C. Wildlife Resources Commission began reintroducing muskies in rivers and reservoirs throughout the mountain region. Fishable populations now exist in the French Broad, Nolichucky, lower South Toe and New rivers, Lake Adger, Lake James and Lake Rhodhiss. Muskies are occasionally caught in Fontana and Hiwassee reservoirs, where stocking was attempted in the past but abandoned because so few of the stocked fish seemed to grow to catchable size.

WHY STOCK MUSKIES?

Some of western North Carolina's most popular muskie fisheries are maintained by fingerling stocking. This type of stocking is necessary only in waters where natural reproduction cannot support a sport fishery, usually because vegetated backwater habitats preferred by young muskies are unavailable. Muskie fingerlings are raised at the Wildlife Commission's Table Rock Fish Hatchery in Burke County and released in early fall. After two years in the wild they may reach 30 inches or longer.

DON'T MUSKIES EAT ALL THE OTHER FISH?

Like most game fish, muskies are predators. Because they grow to a large size (4 feet or longer) they can prey upon a wide range of creatures, including fish, amphibians, and even small mammals and waterfowl. By removing weak, sick or injured prey, predators play an important role in maintaining the health of the aquatic community. Although muskies occasionally prey upon smaller sport fish (including other muskies), they seem to prefer soft-rayed fishes like suckers. Muskies are found in some of western North Carolina's most popular bass and walleye fishing spots, where they have coexisted alongside these other sport fishes for many years.

CURTIS WOOTEN / NCWRC

F. EUGENE HESTER

MUSKIE LURES

Jitterbug

Bucktail

Crankbait

Rapala Floating Minnow

SOC CLAY,

muskie population of any North Carolina river. A section of the river between Wilson Creek Road (S. R. 1540) and the U.S. 64 bridge near Etowah is under a trophy size and creel limit regulation. Only one fish measuring 46 inches or longer can be kept per day, whereas in other waters two fish a day 30 inches or longer may be kept.

The Nolichucky River in Mitchell County receives approximately 70 fingerlings each year. Muskies are found in the North Carolina section of the Nolichucky all the way to the Tennessee line. The Nolichucky has the lowest muskie population of all Tar Heel fisheries, but every year lunker-sized fish are taken from this river.

The final North Carolina muskie waters are the New River and South Fork of the New River. The New River dips in and out of North Carolina and Virginia for nearly 30 miles from the confluence of the North and South forks until it leaves North Carolina for good between Sparta and Independence, Va. The commission stocks approximately 125 muskie fingerlings in the New and South Fork each year, and the New also receives stockings from Virginia. Fishing pressure is relatively low for muskies along this section of the popular smallmouth river.

Lures and Techniques

Muskie lures and techniques vary from lake to river and even from river to river, but some lures are consistent producers almost anywhere. In the spring and fall at Lake Adger, anglers use jerkbaits, crankbaits and bucktails around fallen timber, main lake points and other transition zones between shallow and deep water. During the summer when the surface temperature reaches the low 80s, the muskies go deep, making trolling with Cisco Kids, Big Macs and other deep-diving lures the preferred tactic.

In rivers, shallow-running baits that help you avoid getting hung up on brush and rocks are best. Probably more Southern river muskies have been caught on size 18 Rapala floating minnows or Bomber Long A's than any other bait. These 7-inch-long, slim minnow crankbaits imitate a wounded fish such as a sucker, a favorite muskie forage fish. Preferred colors are silver or gold with a black back and a rainbow trout pattern. Another favorite for river fishing is the bucktail. Unless you're a muskie fisherman, you probably think of a bucktail as a white leadhead jig with the hair from a deer's tail tied around it as a collar, a popular striper and white bass bait. To muskie fishermen, however, a bucktail is a huge in-line spinner. It is an oversized version of a Mepps-type spinner with a deer-hair-dressed treble or tandem trebles and usually weighs from ¾ ounce up to 2 ounces.

The bucktail is a great river bait because it can be fished very shallow to several feet deep by varying the speed of the retrieve. Favorite colors include black, white or yellow with silver, gold or copper blades. Sometimes "hot" colors such as fluorescent chartreuse or orange can be effective in stained or murky water. Another option often overlooked by anglers is topwater baits such as buzzbaits and the muskie Jitterbug. These lures are especially good early and late in the day or at night, and can bring explosive strikes. Black seems to be the color of choice in low light, with chartreuse sometimes working well on overcast days.

Muskies are caught every year on standard bass tackle without steel leaders, but luck needs to be on your side. Even when hooked in the lip or corner of its mouth, a muskie can cut the line when it changes direction and the line gets in all those sharp teeth. If you are seriously targeting muskies, you'll need special equipment. Heavy mono or braided line is essential for muscling big fish out of heavy cover and rock ledges, and steel leaders are a must to keep the fish's teeth from cutting the main line. Most muskie fanatics use at least 30-pound-test mono or braid of at least 50-pound test and even up to 80. Steel leaders should be at least 50-pound, and many anglers use leaders testing out at over 100. To some people this might seem like overkill, but after you've invested several thousand casts to get a fish on, you don't want a big muskie to break you off or bite through your leader. Line and terminal tackle are relatively inexpensive, so don't scrimp on these parts of your arsenal.

Rods and reels should be large enough to handle the heavy line with enough backbone to turn big fish away from cover. Leave your light tackle at home; this is not a finesse game. Baitcasting reels are favored by most, such as the old reliable Abu Garcia 6500 or the newer Shimano reels such as the Calcutta, but some do use spinning tackle. With the advent of braided lines, which have a smaller diameter per pound test than mono, spinning reels can now be spooled with heavy line while using a much smaller reel. Before braid, the only

spinning reels big enough to handle muskies were surf-casting reels, which were awkward and too heavy to cast all day.

Rods should be matched to the baits you'll be fishing, with a heavy butt section and a lot of backbone. If you're going to limit yourself to throwing minnow-type baits such as Rapalas or Long A's and bucktail spinners, a 6½- or 7-foot heavy bass rod rated to 1½ ounces would work. However, with some of the jerkbaits and other muskie plugs weighing up to 3 ounces, you need a rod designed for muskie fishing if you're going to fish these lures.

Many companies make rods designed for muskie fishing. Higher-end rods from G. Loomis or St. Croix down to cheaper alternatives such as Bass Pro or Cabela's brands are available. More expensive rods will be lighter and better designed to cause less fatigue after a long day of casting heavy plugs, but there is a muskie rod for every budget.

It's Not for Everyone

Muskie fishing is definitely not everyone's cup of tea. There are long hours of unproductive casting that make you think your arm will fall off. Then you have the frustrating follows when your best figure 8 won't bring a strike, even though the fish follow the lure all the way to the boat. Muskie fishermen are a special breed of dedicated, hardcore anglers. If you would like to try muskie fishing, I would suggest incorporating it into a trip for other species, such as a smallmouth bass float trip or a largemouth bass trip to Lake Adger. You can fish for muskies until you tire of it and then catch some of the less fickle game fish. Then dedicate some more time to muskie fishing. Target big, slow holes on a river or the fallen timber of a lake.

Be careful if you do catch one—you might end up becoming one of those fanatical muskie fishermen, and people will talk about how crazy you are to stand out there on your boat and cast, and cast, and cast... ◆

Marty Shaffner is a western North Carolina fishing guide who works with Tri-State Angler Guide Service. Contact him at info@tristateangler.com.

Although many muskie lures (top left) look similar to bass lures, for the most part they are much larger. Because muskies are big fish and can inhabit brushy underwater areas, most anglers use these lures on heavy line. Steel leaders prevent muskies' sharp teeth from cutting through monofilament.

ERIC ENGBRETSON

***Phew!* People often complain when their noses notice skunks. But for these North Carolina natives, that powerful scent is really the**

Sweet Smell of Success

written by Julie Dunlap / illustrations and nature activity by Anne M. Runyon

Some folks call them "smelly cats" or "stinking polecats." But whatever you call them, you know skunks. Bold-patterned, black-and-light coats advertise a widespread, well-known family: Mephitidae—meaning "bad odor" in Latin. The rarely seen but hard-to-miss clan can be sniffed out anywhere from Canada to Argentina. What makes skunks so successful?

FAMILY FORTUNES

Besides their famous aroma, all members of the skunk family share valuable traits such as short legs and tough claws for digging up their dinner. The largest skunk species, hognose skunks, are as big as overfed housecats, while spotted skunks are the size of pampered kittens. Luxurious fur coats protect every species, whether they're hooded skunks living in a desert canyon or Western hognose skunks on a mountain slope. Our Eastern spotted skunks have the silkiest fur of all.

Darkness protects skunks, too, because their nocturnal habits hide them from predators that hunt in daylight. Since they're awake at night, you may rarely see skunks outside. The familiar striped skunk has a patchy, but constantly changing, distribution throughout the state—in towns, farm country, wooded parks and along beaches. The less-common Eastern spotted skunk prefers our Mountains, often in brushy woods or fields with nearby forest.

Striped skunks (right) usually eat eggs only from ground-nesting birds, but spotted skunks (left) are good climbers and can raid songbird nests.

One of the few predators that does catch skunks is the great horned owl. This night hunter swoops out of the dark without warning and catches a skunk before it can spray.

PRIVATE JETS

The biggest reason for skunk success is no secret at all. Two glands under its tail are the reason why such a small critter can send bears and other predators running for cover. Those glands can blast a jet of sticky, rotten-egg-smelling liquid over 15 feet, straight into the face of a hungry bobcat or fox. Like a putrid perfume, skunk musk burns the target's eyes and clings to its fur for days. Just one encounter may teach a less-than-crafty coyote that black-and-white fur warns, "Back off!"

Yet skunks resist using their dreaded weapon. When possible, the shy animals hide or run from danger. If a skunk cannot escape, it tries to frighten away an attacker by hissing, stamping its feet and scratching the ground. Then, it may charge the foe, tail hoisted high, in a bluff attack. Spotted skunks may even perform a circus-worthy handstand. But if the predator still threatens, the skunk curves its body into a U-shape, so its head and tail point toward the trouble-maker, and squirts!

CRICKET CAVIAR

With such powerful defenses, skunks enjoy the luxury of waddling through the night, gathering a leisurely supper. Their strong teeth and jaws can chomp almost anything into a five-star meal: mice, lizards, wild grapes, crickets or roadkill. Insect-loving striped skunks' claws tear into rotting logs after beetle grubs, and their thick fur protects them from stings when they're feasting on honeybees, larvae and pupae. City skunks also find rich rewards in pet food bowls, vegetable gardens and garbage cans. Diets vary with the seasons: Spring brings bird egg breakfasts and autumn means snacks of nuts and fallen apples.

After a long night of dining, skunks retire to their dens. Instead of fancy accommodations, the perfect resting spot may be in a hollow log, under a pile of rocks or in a groundhog burrow, even if the groundhog is still there. Sometimes, a skunk digs its own den or finds a cozy space in an abandoned farm shed. Most of the year, each skunk lives alone. But in winter, several females may curl up together to stay warm. Skunks do not hibernate, and they are active all year in warm Southern states. But in Northern or mountainous climates, skunks may sleep for weeks at a time, living off stored body fat until the worst of winter's chill is over for the year.

INVESTING IN THE FUTURE

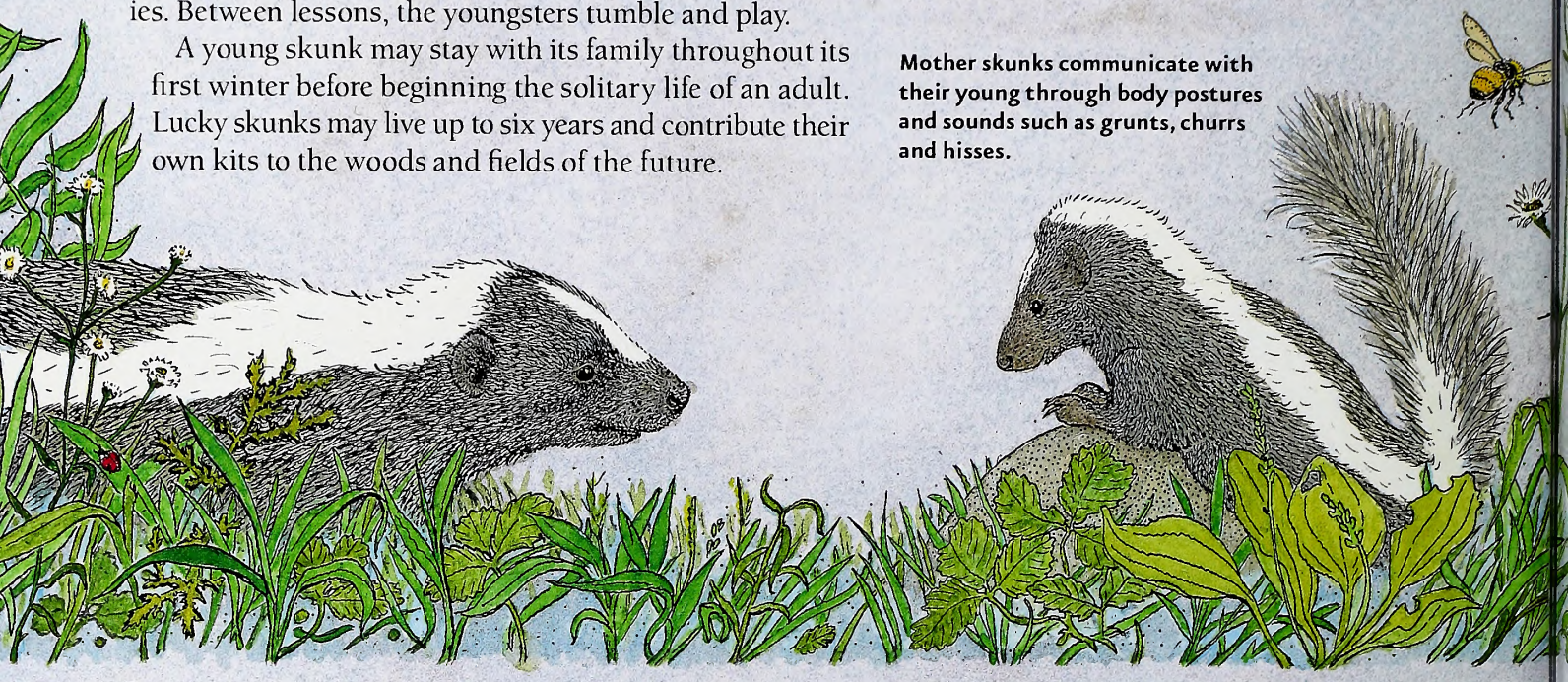
In early spring, skunks invest much of their energy into finding mates. Once two skunks have mated, the female heads off on her own. She lines a den with grass and leaves, where she gives birth to two to 10 blind, helpless young. For about six weeks, the skunk kittens nurse and grow in their snug shelter.

Then one evening, a parade of skunks may surprise you by marching out from under your porch. The mother leads her kittens, single file, helping them learn to use their noses and other senses to find bugs, berries and other choice goodies. Between lessons, the youngsters tumble and play.

A young skunk may stay with its family throughout its first winter before beginning the solitary life of an adult. Lucky skunks may live up to six years and contribute their own kits to the woods and fields of the future.

REVERSAL OF FORTUNE?

Adaptations from nose to tail have helped make skunks a wildlife success story. Striped skunks, especially, are increasing their numbers in North Carolina and elsewhere. But they have hard luck, too. Many people see skunks as pests, and cars kill thousands every year. Pavement and construction take over spaces they need to live. But people who view skunks as part of a healthy ecosystem know they help make the natural environment richer for all of us.



Mother skunks communicate with their young through body postures and sounds such as grunts, churrs and hisses.

Get Outside

Follow your nose. Have you smelled skunks near your house? If so, look around for visible signs of your odorous neighbors. Their five-clawed tracks are fairly easy to identify with the help of a field guide, perhaps around the entrance to a groundhog burrow or beside your back porch. Another typical sign is small diggings, 1–2 inches deep and 3–4 inches across, where an animal clawed and rooted for dinner. If you visit a park, farm field or woodlot, ask a naturalist, farmer or local resident to suggest places to look for skunk signs. In places like Great Smoky Mountains National Park, where both species live, ask where each kind prefers to live. Some people can tell them apart by the smell alone! And try to imagine as you explore: Is this good skunk habitat? What kinds of food could it find? Is there water nearby? Is there a possible shelter in an underground den or abandoned cellar? Or are there lots of busy roads and little cover or food? Be careful, though. If you find skunks, even young ones in a den near your home, never touch them. Skunks can sometimes carry rabies and should be left alone.

Read and Find Out

- "Skunks and Their Relatives" by Timothy Biel, San Diego Zoobooks, 1996.
- "Living with Skunks" by Les Line, *National Wildlife* magazine, October/November 2007.
- "Skunks" by Adrienne Mason, Kids Can Press, 2006.
- "Skunks Do More Than Stink!" by D. M. Souza, Millbrook Press, 2002.

In *Wildlife in North Carolina:*

- "Nature's Stop Sign" by Lawrence S. Earley, Oct. 1991.
- "Night of the Living Skunk" by Doug Elliott, Feb. 1989.

On the World Wide Web:

- "Nature" PBS episode: "Is That Skunk?" http://www.pbs.org/wnet/nature/episodes/is-that-skunk/video-full-episode/4581/

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make a Spotted Skunk Sculpture

1) Cut out the skunk design and fold it in half, carefully matching the two halves. Hold your design up to a light. Adjust your fold to match skunk outline closely.
2) Cut out folded skunk following the thick outline on left half. For tail parts, cut out rounded, then go back and cut the V's. Be sure to cut away all the black outline on the white fur.
3) Unfold skunk and fold black tail up under big white tail.
4) Fold both sides of body down along black lines on rumps.
5) Glue black tail tip to big tail, slightly curling big tail forward.
6) Glue head shut.
7) Overlap green katydid heads and glue.
8) Bend hind feet out and crease sides at hind leg "knees" slightly for stability.

This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational use.

Trout Fishing Big Boost for Mountain Economy

Trout fishing opportunities provided and managed by the N.C. Wildlife Resources Commission have a substantial positive impact to the economies of western North Carolina counties and towns and to the state as a whole, according to a recent study conducted by Responsive Management and Southwick Associates.

The study, "The Economic Impacts of Mountain Trout Fishing in North Carolina," found that nearly 93,000 anglers fishing in North Carolina spent an estimated $146 million on mountain trout fishing trips and equipment in 2008. When the secondary (multiplier) effects of these dollars were factored in, the total economic output of the commission's trout management program in North Carolina exceeded $174 million.

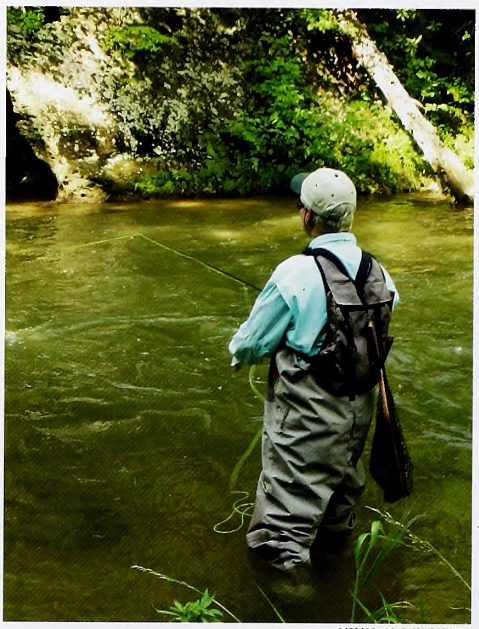
Money spent on mountain trout fishing in 2008 supported a total of 1,997 jobs and provided an estimated $56 million in income, much of it to workers in western North Carolina.

From late March through early April, Responsive Management, a firm specializing in natural resource and outdoor recreation issues, conducted a telephone survey of 1,232 randomly selected licensed anglers 18 years and older who fished for mountain trout in 2008. Southwick Associates developed the economic models.

The survey was funded by the commission under the Federal Aid in Sport Fish Restoration program.

Survey respondents answered questions pertaining to fishing trip and equipment expenditures, numbers of days fished and types of streams fished.

An estimated 92,765 resident and non-resident anglers fished for trout 1.42 million days in North Carolina in 2008, with Transylvania, Watauga, Haywood, Cherokee, Henderson, Jackson and Ashe counties seeing the most fishing activity.



MELISSA McGAW / NCWRC

A typical resident trout angler fished nearly 10 days in 2008, spending $65 per day on trip expenses while a typical nonresident angler fished five days in 2008 and spent $158 per day on trip expenses. The average resident trout angler spent $502.92 per year on equipment.

Other survey findings included the following:

- Hatchery-supported waters were the most frequently fished waters (625,147 days), followed by wild trout waters (422,671 days); and delayed-harvest waters (374,611 days).
- Total economic impact of hatchery supported waters measured $72.7 million; $55.2 million for wild trout waters and $46.5 million for delayed harvest.

According to Doug Besler, the mountain region fisheries supervisor for the commission, the agency funded the study to help quantify the economic impact of its trout management program on North Carolina's economy. Survey results from this study, combined with results from an earlier angler opinion study, will be used to develop a comprehensive trout management plan, enhance public fishing opportunities, and market the agency's angling opportunities to North Carolina residents and tourists alike.

"The economic impact of the trout management program can be a significant contributor to the expanding tourism and green-based economies of western North Carolina," Besler said. "The commission looks forward to pursuing collaborative opportunities to expand public fishing opportunities for trout fishing in western North Carolina."

Visit the commission's Web site at www.ncwildlife.org to read the full report.

CALENDAR OF EVENTS

Tuesday–Sunday, Nov. 3–8

Learn about the diverse habitats and wildlife of the Outer Banks at Wings Over Water in Kill Devil Hills. Participants may bird and paddle the marshes and coast, listen for red wolves and watch for bears in pocosin forests and open fields.
Visit www.wingsoverwater.org.

Saturday–Sunday, Nov. 7–8

Spend a day at the inaugural Western North Carolina Fly-Fishing Expo in Fletcher. Programs will concentrate on mountain fishing. Fly-casting instruction is offered. Exhibitors include gear manufacturers, fly shops, guide services and the N.C. Wildlife Resources Commission.
Visit www.wncflyfishingexpo.com.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

ASMFC Might Halt Weakfish Harvest

The Atlantic States Marine Fisheries Commission (ASMFC) could take emergency action as early as this month to ban all harvest of weakfish along the entire East Coast.

Weakfish stock has reached an all-time low of 2.9 million pounds, far below the proposed biomass threshold of 22.4 million pounds. Landings and dead discards were estimated at 1.9 million pounds in 2007 and 1.8 million pounds in 2008.

At its August meeting, the ASMFC's Weakfish Management Board, calling the condition of the stock "dire," proposed options to reduce fishing mortality, including a catch moratorium. Scientists agree that the decline of weakfish, also known as gray trout and squeteague, is due to natural causes and not harvest. Predation, competition with other fish and environmental changes have affected weakfish stock much more than fishing mortality.

"Given the natural mortality the stock is unlikely to recover quickly even with a harvest moratorium," the ASMFC said. "In order to rebuild the stock, total mortality will need to be reduced, although this is unlikely to occur until natural mortality decreases to previous levels."

Weakfish also are susceptible to cold. Hugh M. Smith wrote in his 1907 "The Fishes of North Carolina" that a "trout numb" was reported in Beaufort in late November 1903 when the weather became suddenly cold. "[M]any gray trout were picked up by numerous fishermen, the fish floating or on the shores and just able to move their fins. One boat with two men secured 900 pounds."

In North Carolina, commercial landings of weakfish were only 170,394 pounds in 2008 compared to 685,469 in 2004. The recreational catch in 2008 was 136,471 pounds compared to 273,685 in 2004.

Young Bucks' Contributions More Than Believed

When it comes to mating patterns, a new study finds that among white-tailed deer, every buck has a shot at contributing to the next generation. Previously, studies of the mating habits of deer have focused on behavioral observations, and it appeared that a few dominant, mature bucks obtained most of the matings and therefore likely sired most of the offspring each year. But a new study that uses genetic paternity tests (rather than observations) within three deer populations produced unexpected results. This study finds there is a wider distribution of age and physical maturity among fathers of white-tailed deer.

The study, published in the August 2009 issue of the *Journal of Mammalogy*, contradicts longstanding assumptions about white-tailed deer mating patterns. Studies characterizing male reproductive success as highly skewed with a small number of mature dominant males monopolizing breeding are criticized for depending too heavily on behavioral observations and circumstantial evidence. In the current study, physically immature males 1.5 to 2.5 years of age were found to have fathered 30 to 33 percent of offspring in the populations examined, even where larger, mature males were present.

Social dominance alone may not guarantee reproductive success, the study finds. Ecological and behavioral variables also may be at work, limiting the ability of individual males to control access to females. Young or subdominant males may be successful in fertilization by using alternative strategies that do not rely on dominance.

Male mating tactics include roaming widely in search of females in heat. Paying proper attention to a doe is another method—males may spend up to 24 hours "tending" to a receptive female. The study also cites evidence of female promiscuity among white-tailed deer that could make finding a mate easier for male deer of any age.

The locations of the three "captive" populations of white-tailed deer studied are Noxubee National Wildlife Refuge in Mississippi, the King Ranch in Texas and the Noble Foundation Wildlife Unit in Oklahoma. Due to long-term differences in the management of "harvesting" the deer—one location allowed public hunting while another placed more conservative restrictions on thinning the herd—each of these populations had varying demographics, allowing for a qualitative evaluation of factors such as adult sex ratio and male age structure on male reproductive success.

More N.C. Torreyas

Mount Olive botanist A. J. Bullard called to inform us that some information was missing from our story "Rewilding a Native" by Sidney Cruze in the Aug. 2009 issue. When we asked what was missing, Bullard blew our minds by revealing that there is another living *Torreya taxifolia* tree in North Carolina that is well over a century old. This tree was one of two that were planted in Clinton in the 1850s, around the same time that it is estimated the state champion tree in Norlina was planted. A storm in the late 1990s knocked down one of the Clinton *Torreyas*, but the other survives today.

Bullard also explained that researchers had traced the Norlina and Clinton trees to a single source. Pomaria Nurseries, an antebellum outfit near Columbia, S.C., sold a tremendous variety of native and exotic fruit trees, ornamental trees, shrubs and flowers during that era. Scientists made the connection because Osage orange trees were planted near both *Torreya* sites, and Pomaria sold both types of trees.

Bullard and his late cousin, Bob Melvin, verified the identity of the Clinton trees in 1995 and collected 5,000 seeds from the trees, which they distributed to botanists across the state for attempted propagation. Seeds were planted at sites from Meredith College in Raleigh to Western Carolina University in Cullowhee.

Perhaps the most surprising fact Bullard provided was that, contrary to botany textbooks, the *Torreya* is not dioecious—that is, having male and female reproductive structures on separate plants. Rather, it is monoecious, because both the Norlina and Clinton trees are producing viable seeds with no other *Torreya* around. Bullard knows this firsthand because he has two *Torreya* trees on his own property—both bearing fruit.

–Greg Jenkins

Forbush Shooting Teams Win National Titles

Once again, teams and individuals from North Carolina topped the competition at the Youth Hunter Education Challenge, held at the NRA Whittington Center near Raton, N. M.

Yadkin County's two Forbush teams took first place in both senior and junior divisions at the 24th annual national championship. Park Ridge Sharpshooters of Stanly County came in third in the junior division.

Austin Warner of West Montgomery High School took first place in the overall senior individual division, while Todd Patterson of Forbush Elementary School won first place in the junior individual division, and Nick McDonald of Fall Creek Elementary School came in third. Farmville Central High, Jones County High, North Davidson High and South Stanly High also represented North Carolina.

The Youth Hunter Education Challenge is a weeklong series of events, featuring shooting competitions of .22-caliber rifle at knock-down targets, muzzleloader at knock-down targets, shotgun on a sporting clays course and archery at three-dimensional game targets. The nonshooting competitions consist of orienteering skills, wildlife identification, a written hunter responsibility and ethics exam, and a hunter safety trail test.

"The Youth Hunter Education Challenge is a demanding and rewarding event," said Travis Casper, assistant hunter education coordinator for the N.C. Wildlife Resources Commission. "Everyone gets a chance to demonstrate what they've learned through hunter education, and it is an opportunity to learn. We're proud of all the teams from North Carolina that undertook the time and expense to make the trip out West."

Three hundred and fifty youth competitors, adult coaches and parents attended this year's event. Some 50,000 young people take part in youth hunter safety and skills competition events across the United States and Canada annually.

In North Carolina, the Youth Hunter Education Skills competition is an incentive component of the state's hunter education program, with teams from elementary, middle and high schools, both public and private. Home-schooled students and teams representing organizations such as 4-H or FFA also can compete, provided they meet eligibility requirements.

Hunter education is required for all first-time hunting license buyers. For more information, visit www.ncwildlife.org or call (919) 707-0031.

NCWRC

In addition to the two winning Forbush teams, North Carolina was represented by seven other schools.

IN SEASON

This month, these seasons are open in North Carolina:

Black Bear: See 2009–2010 *North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for seasons and locations.
Bobcat: Through Feb. 28.
Common Snipe: Nov. 13–Feb. 27.
Crow: Through Feb. 28.
Fox: See *Regulations Digest* for seasons and locations.
Grouse: Through Feb. 28.
Hatchery-Supported Trout Waters: Through Feb. 28.
Mourning Dove: Nov. 23–Nov. 28.
Pheasant: Nov. 21–Feb. 1.
Quail: Nov. 21–Feb. 28.
Rabbit: Nov. 21–Feb. 28.
Raccoon and Opossum: Through Feb. 28.
Rails, Gallinule and Moorhen: Through Nov. 13.
Squirrel: Gray and red through Feb. 13; fox through Dec. 31 in selected counties.
White-tailed Deer:
Eastern: Gun through Jan. 1.
Central: Bow through Nov. 6; muzzleloader Nov. 7–13; gun Nov. 14–Jan. 1.
Northwestern:
Bow through Nov. 13; muzzleloader Nov. 14–Nov. 20; gun Nov. 21–Dec. 19.
Western: Bow through Nov. 21; gun Nov. 23–Dec. 12.
Wild Boar: Through Feb. 28 only in Cherokee, Clay, Graham, Jackson, Macon and Swain counties. In the other 94 counties of the state, feral hogs are not considered to be wild boars, and the commission does not regulate them.

Migratory Waterfowl
Dark Geese (Canada and white-fronted): Resident Population Nov. 14–Dec. 5; Southern James Bay Population through Nov. 7 and Nov. 14–Dec. 31.
Snow, Blue and Ross' Geese: Nov. 14–March 10.
Brant: Nov. 21–Dec. 5.
Tundra Swan: Nov. 14–Jan. 30 (permit only).
Ducks, Coots and Mergansers: Nov. 14–Dec. 5 (black and mottled ducks closed until Dec. 1).
Sea Ducks: Through Jan. 30 in Special Sea Duck Area.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the 2009–2010 *North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

THE WILDLIFE ENDOWMENT FUND

An Investment for the Future

Established in 1981, the Wildlife Endowment Fund allows the Wildlife Resources Commission to accept tax-deductible contributions for wildlife conservation. Money from the sale of lifetime licenses and lifetime magazine subscriptions is also placed in this fund. Your donation or purchase will ensure that North Carolina will have a rich wildlife heritage for generations to come.

Lifetime License Form

Infant and Youth *(check appropriate block)*:

- ☐ Sportsman Infant $200
  (under 1 yeor old—Application must be received before applicont has ottoined 1 year of age.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Infant $275
  (under 1 year old—Applicotion must be received before opplicant hos ottained 1 year of oge.)
- ☐ Sportsman Youth $350
  (ages 1 through 11—Application must be received before applicont has ottained 12 years of oge.)
- ☐ Unified Sportsman/Coastal Recreational Fishing Youth $450
  (oges 1 through 11—Application must be received before opplicant hos attained 12 years of age.)

A copy of the birth certificate must accompany applications for infant and youth licenses. Birth certificate documentation cannot be returned.

Note: Pending satisfactory completion of the hunter safety course, persons who possess infant or youth licenses may exercise the privileges thereof when accompanied by an adult who is properly licensed to hunt in North Carolina. "Accompanied" is defined as maintaining a proximity to the hunter which enables the adult to monitor the activities of, and communicate with, the hunter at all times.

Adult (age 12 or older) *(check oppropriote block)*:

- ☐ Comprehensive Inland Fishing. $250
  (N.C. residents only—includes basic inlond fishing, trout & trout woters on game lands)
- ☐ Comprehensive Hunting. $250
  (N.C. residents only—includes basic hunting, big game, gome lands & N.C. waterfowl)
- ☐ Sportsman. $500
  (N.C. residents only oge 12 or older—includes bosic hunting & inland fishing, big game, gome londs, trout & N.C. woterfowl)
- ☐ Coastal Recreational Fishing $250
  (N.C. residents only—includes coostol recreational fishing)
- ☐ Unified Sportsman/Coastal Recreational Fishing $675
  (N.C. residents only—includes same privileges os the Sportsmon, plus coastal recreational fishing)

A federal waterfowl stamp must be purchased separately for all N.C. hunting licenses.

Note: On or after July 1, 1991, a person, regardless of age, may not procure a hunting license or hunt in North Carolina without producing a certificate of competency for completing the hunter safety course or a hunting license effective prior to July 1, 1991, or by signing the statement below that he or she had such a license.

Check appropriate block and attach required copy:

- ☐ Copy of Prior Year Hunting License
- ☐ Copy of Hunter Safety Certificate of Competence
- ☐ In lieu of copy, I am signing the statement below:

Statement: I certify that I was a licensed hunter prior to July 1, 1991.

Signature _____ Date _____

Visit us online at www.ncwildlife.org or call 1-888-248-6834 for a complete list of lifetime licenses, including those for nonresidents and 65 and older.

Lifetime License

Complete the following information if applying for a lifetime license. Be sure to check appropriate block(s) on reverse side ***(please print legibly)*****:**

Name of Applicant_____

Daytime Phone _____

Mailing Address_____

Resident Address_____

County _____Date of Birth _____ Driver License # _____

E-mail Address_____

Is this license a gift? ☐ Yes ☐ No If yes, mail license to ☐ Donor or ☐ Applicant.

License Donor's Name *(if applicable)* _____

Donor's Telephone # _____

Donor's Mailing Address_____

City _____ State _____ Zip_____

Method of Payment: ☐ Check ☐ VISA ☐ MasterCard

Acct. #_____ Expires _____

Print name exactly as it appears on credit card _____

Cardholder's Signature_____ Date_____

Personalize your Lifetime License for an additional $5:
Indicate your selection of letters, numbers, dashes, periods, commas and /or blanks up to 6 spaces: ___ ___ ___ ___ ___ ___

Indicate your personal message including letters, numbers, dashes, periods, commas and /or blanks up to 21 spaces:

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Signature of Applicant or Donor _____ Date_____

Note: Only adult lifetime licenses may be purchased by phone or online (VISA or MasterCard only). Call toll-free (1-888-248-6834) or visit us at www.ncwildlife.org. Use this form to purchase infant and youth lifetime licenses by mail.

Tax-Deductible Contribution

☐ I wish to make a tax-deductible contribution to the Wildlife Endowment Fund.
Enclosed is my check for $_____. ***(Credit card payments cannot be accepted.)***

Name _____

Daytime Phone_____

Mailing Address _____

City _____ State_____ Zip _____

Make checks payable to: ***Wildlife Endowment Fund***

Transactions are not considered final until the check has cleared the bank. Items purchased with a returned check will be made invalid. A service charge of up to $25 will be charged on any returned check. (N.C.G.S. 25-3-506)

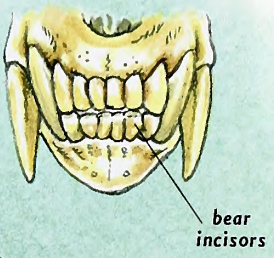
Mail completed application and payment to:
NCWRC, License Section, 1707 Mail Service Center, Raleigh, N.C. 27699-1707

Office location: ***NCSU Centennial Campus, 1751 Varsity Drive, Raleigh, N.C. 27606***
Telephone: 1-888-248-6834 (2HUNTFISH)

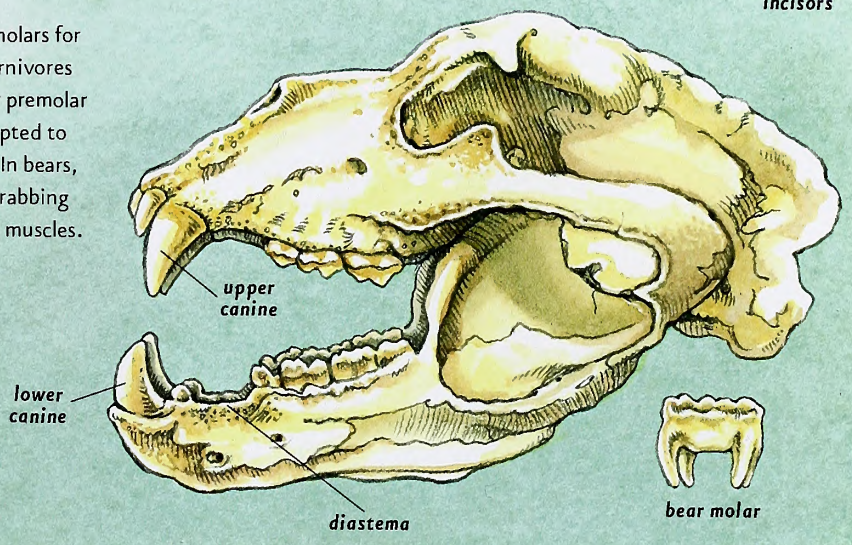
How Are Bear Teeth Adapted To An Omnivorous Diet?

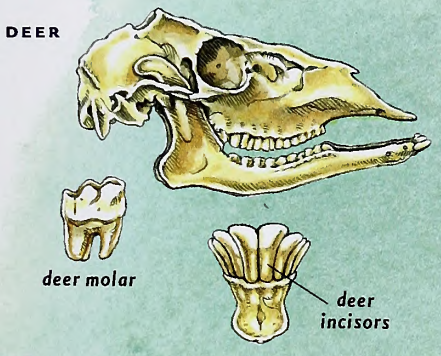
written by Clyde Sorenson
illustrated by Jim Brown

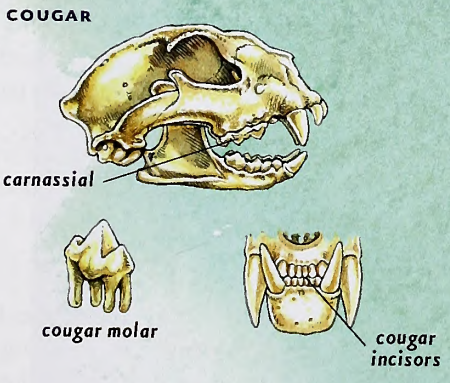
THE BLACK BEAR'S ABILITY TO EAT almost anything is one of the main reasons for the creature's amazing adaptability. Bears are carnivores adapted to an omnivore's diet, and their teeth reflect this.



Unlike other carnivores, bears have broad, relatively flat molars for finely grinding acorns, grasses and other vegetation. Carnivores have specially modified teeth, consisting of the last upper premolar and first lower molar on each side, called carnassials, adapted to shearing off chunks of meat, which are swallowed whole. In bears, these teeth are poorly developed; bears tear off meat by grabbing it with their canines and pulling with their powerful neck muscles.







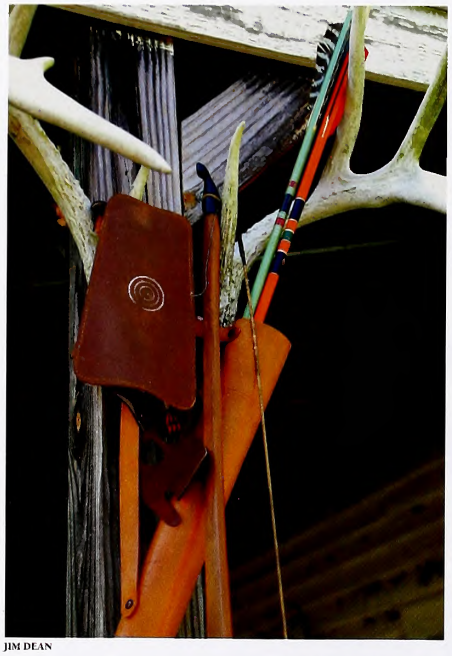
Bears, unlike other carnivores, but like deer, have broad, spatulate incisors, perfect for grazing on grasses and other vegetation. Also like many herbivores, bears have a gap, or diastema, in the teeth in their lower jaws. This gap allows them to manipulate vegetable foods with their tongues and strip tender leaves from twigs and forbs.

While black bears are omnivores that probably eat much more vegetation than meat, they are very effective predators. They use their large canines to good effect when killing prey animals. But apart from these large and impressive canine weapons, the teeth of a bear are strangely reminiscent of another very successful omnivore — humans.

Robin Hood Redux

written by Jim Dean

The cluttered room I use as an office is filled with artifacts of what some might consider a misspent life—fishing and hunting gear, books, cameras, decoys, ship models, fly-tying materials and similar stuff, much of it awaiting a long-overdue yard sale. The walls are festooned with photos and clippings of little interest to anyone but me. However, one display always catches any visitor's eye.



JIM DEAN

Hanging above the closet door is a 6-foot lemonwood longbow with tips made of real horn and a flaxen bowstring rubbed slick with beeswax. Hanging next to it are a few feather-fletched Port Orford cedar arrows in an old quiver, a leather armguard and a simple leather finger tab. My father, Graham Dean, made that bow when he was a young man, which means it must be at least 75 years old. His favorite childhood book had been "The Merry Adventures of Robin Hood," and one of my earliest memories is of Dad sitting on the edge of my bed and reading it to me once when I was sick. Perhaps you recall that when Robin Hood was dying, he weakly shot an arrow and was buried where it landed.

"The longbow was the .357 of its day, eclipsed only by the advent of crossbows and black powder."

When Dad died in 2003, it never occurred to my brothers or me that we were missing a symbolic opportunity to honor the trajectory of his life with a final arrow—and, besides, his spot was always going to be next to Mom anyway. Furthermore, that old bow was likely brittle, and I wouldn't have risked breaking it, especially since I had unfortunately snapped a tip off his homemade Osage orange bow when I was 12. I think he would have been more upset if I hadn't by then learned to share his love of archery.

Frequently, we would go to a vacant lot across the street to shoot at a round straw target. By then, I had a 20-pound lemonwood bow—and later a solid fiberglass 45-pound recurve. We made our arrows, ordering shafts, fletching, nocks and points from L. E. Stemmler in Manorville, Long Island (long out of business). We shot entirely by eye and instinct—no bow sights—and we were pretty good. After all, if you missed, your arrow would burrow under the grass where it was nearly impossible to find.

I was always in awe of Dad's longbow. Even when I was in my 20s, I could barely draw it, and when Dad shot it, the arrow flew so fast and flat to the target that you couldn't track it. Without the armguard, it would roll up the skin from elbow to wrist like a peeled banana. Chain mail in Robin Hood's time was no match for such a weapon, and even most solid armor relied upon deflection. The longbow was the .357 of its day, eclipsed only by the advent of crossbows and black powder.

In the last century, archery has undergone a gradual evolution until fairly recently. Howard Hill downed African big game with longbows—he even successfully hunted elephants in the 1951 movie "Tembo." Fred Bear popularized laminated fiberglass and wooden recurved bows—recurves are an old idea—that were powerful, compact and far easier to carry and hunt with. Newer materials and technology advanced the art of target archery and bow hunting, but the big change came with the development of compound bows.

I am looking at a 2009, 180-page catalog devoted entirely to archery gear and accessories, and I doubt that Robin would recognize much of it. There's only half a page of traditional bows, though he would surely identify an arrow. But I suspect he would guess that a compound bow looks like a bent wagon axle with a well-bucket pulley on each end.

To be fair, however, the modern archer is blessed because this stuff is truly amazing. A compound bow with a state-of-the-art sight may take some getting used to visually, but it is a shooting fool—easier to draw, powerful and astonishingly accurate. Indeed, bows have undergone far more innovation in the past 20 years than the rifle.

Yet, I sense that the greatest satisfaction for even a modern archer may lie in the discovery that the bow stave you laboriously shape by hand will still put a quivering bolt deep in the bull's-eye.

Several years ago, I met an archer on a game preserve in Ohio who proudly showed off his gear. He had hand-wrought everything he needed, including a longbow of yew and an Osage orange recurve for hunting. As I watched, he took a quick, instinctive shot at a pheasant at least 70 yards across a pasture. The bowstring slapped his armguard, and a blur ranged to within a foot of that pheasant's feet, where it stuck nearly shaft deep in the ground. Lucky bird, I thought.

And lucky me, I decided, to have been around to shoot with Dad way back when we roamed Sherwood Forest with Little John and Robin.

JOHN HUNEYCUTT

OUTDOOR MOMENT

Morning dew on maple leaf

IN THE DECEMBER ISSUE

MELISSA McGAW/NCWRC

SWAN LAKE

A tundra swan hunt in the Pocosin Lakes area is an amazing spectacle as well as a great hunt.

MAKING IT

Lost and alone in the winter woods? Stay alive overnight with these survival tips.

HOLLY JOLLIES

North Carolina's useful, ubiquitous native holly trees are more than just prickly leaves and red berries.

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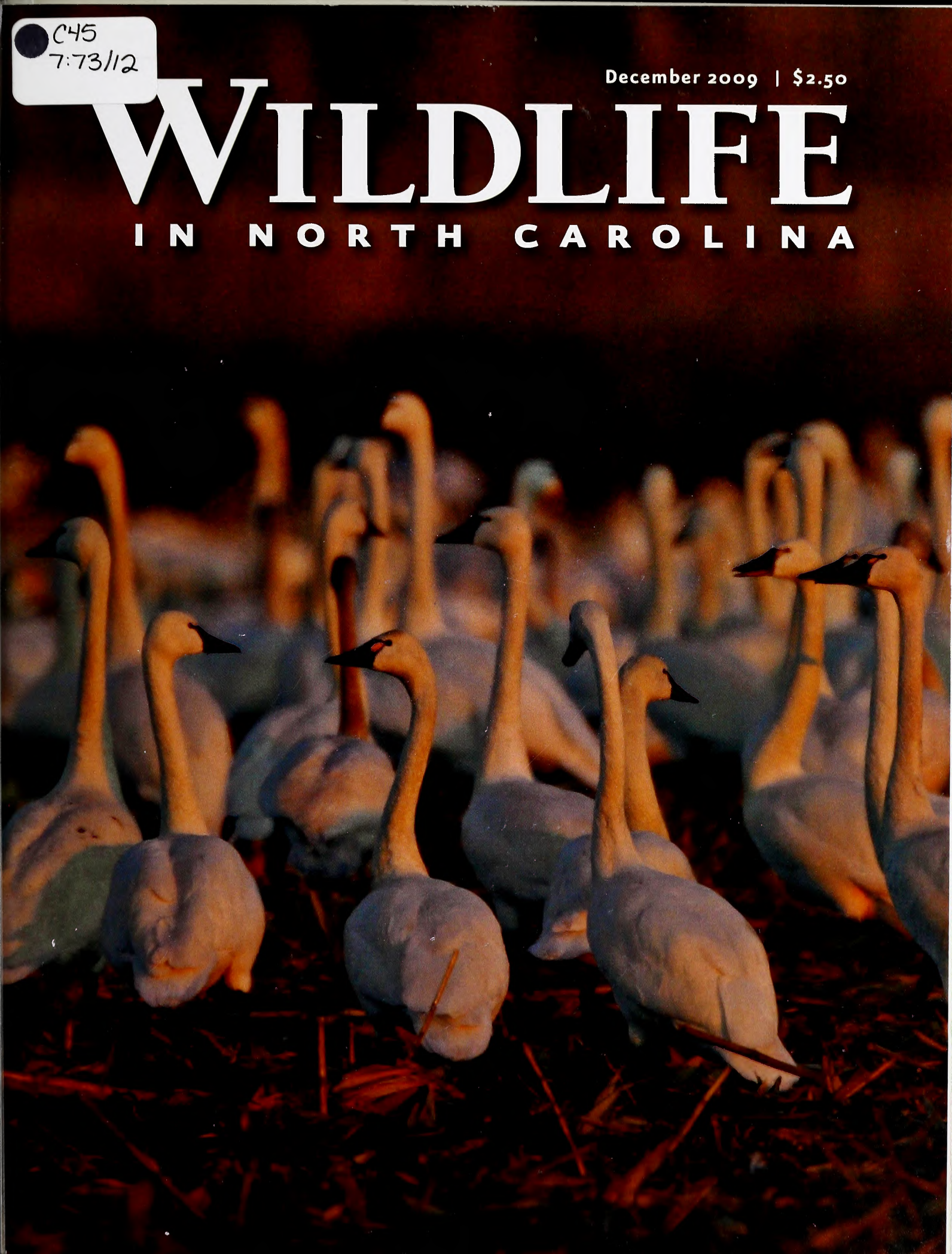
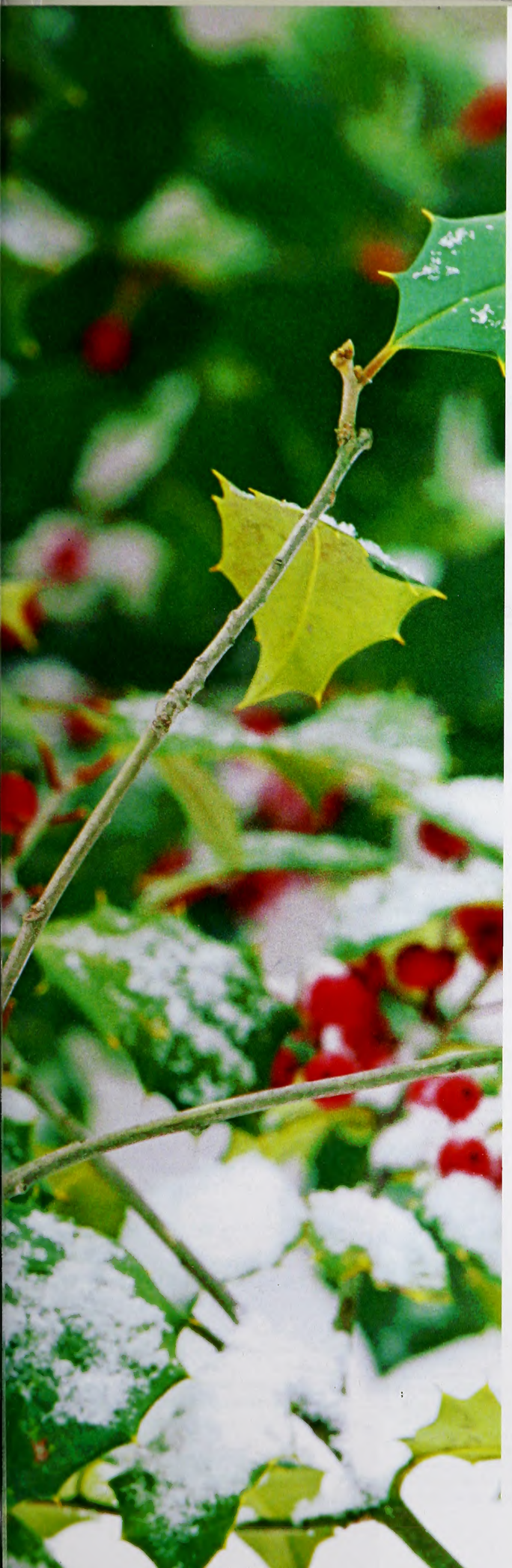
WILDLIFE IN NORTH CAROLINA



Dozens of songbirds such as the robin find shelter and food within the branches of American holly, a native evergreen. **PHOTOGRAPH BY MASLOWSKI WILDLIFE PRODUCTIONS.**



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Cover: Whether the big birds are loafing on the ground or flying en masse to feed, the sight of thousands of tundra swans is breathtaking.
PHOTOGRAPH BY TODD PUSSER.

Wildlife in North Carolina is the official educational publication of the North Carolina Wildlife Resources Commission. It is dedicated to the sound conservation of North Carolina's wildlife and other interrelated natural resources and also to the environment we share with them.

EDITOR'S NOTE

My friend knows what he saw. He was driving down U.S. 64 through Chatham County late one dark night, and illuminated in his headlights was . . . um . . . well, it looked a lot like a bear. It was black, or at least dark-colored, and it lumbered along the shoulder about 20 feet from the side of the road. In retrospect, it could have been someone's lost Newfoundland. But doggone it, it sure looked like a bear.

ILLUSTRATION BY JACKIE PITTMAN

Seeing a bear in Chatham County is not impossible; however, it is highly improbable. Bears have been spotted in many North Carolina counties, but your chances of seeing one in the central Piedmont are astronomically small. Similarly, there now are coyotes in every county in North Carolina, but because of their secretive—and yes, wily—nature, most folks never see one of those either.

And then there are the mountain lions. The N.C. Wildlife Resources Commission says there are no wild, reproducing populations of cougars in the state. But there are plenty of folks willing to swear to high heaven that they saw a panther. Some of them even produce photos, and that's where the problems begin.

Back in September, around the time of the Mountain State Fair, there were e-mails circulating that showed a cougar dragging a whitetail buck by the throat (Back Porch, p. 38). People swore the photo was taken at sites ranging from Hayesville to Sparta. One Wildlife Commission biologist (who was more than a little incensed) said people had shown him the photo on their cell phones and claimed to have taken the picture themselves.

In reality, the photo was captured last February by a trail camera on the ranch of Chet Markgraf in La Vernia, Texas. Markgraf said his son took the photo to college, where his son's roommate began e-mailing it around. Eventually, the photo was forwarded in e-mails with information claiming that it was taken in Pennsylvania, Georgia, New Jersey, Tennessee, South Carolina, North Dakota and a number of other states.

Admittedly, truth can be pretty hard to pin down sometimes. Bruce Ingram does a great job in his story "The Truthiness Problem" on page 14 of detailing some of the myths about wildlife in our state. If you see something improbable and are lucky to get a photo of it, e-mail us a copy at letters@ncwildlife.org. And please tell us the truth about where the picture came from—if you can.

Greg Jenkins

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DECEMBER 2009 VOLUME 73, NUMBER 12

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Gearheads

Jim Wilson's article "Tangled Up In Gear" in the Sept. 2009 issue does a great job of articulating and thoroughly examining a question that I (and perhaps others) have pondered through the years: At what point does the concern about the most and latest gear detract from the thrill of being outside and discovering for yourself whether your reasonable efforts will be rewarded that day? The article calmly helps us consider whether the process itself is at least as worthwhile as the means and the ends.

Jon Maxwell
Greensboro

Fish and Birds

I was very interested in Jim Dean's Oct. 2009 article, "Renewal at Mattamuskeet." But I am very disappointed that he failed to discuss the importance of the canals and water control structures (or lack thereof) to fish. Mattamuskeet is a very important spawning area for anadromous species, especially the two species of river herring.

I certainly hope the canal clearing and dredging projects, as well as the operation of the water control structures in the canals, are being conducted with a balanced evaluation of the impact on our fish populations and not just for the needs of waterfowl. Would you please publish a follow-up story about these fishery issues involving Mattamuskeet?

John R. Spruill
Hampstead

We spend lots of recreational time at Mattamuskeet and I am delighted that it is getting the needed funding for restoration and maintenance. We enjoy the spectacular opportunity to observe wildlife there and in the surrounding national parks. There is no better place on the Eastern seaboard to witness the overwintering waterfowl population.

Last Thanksgiving we were denied access to Mattamuskeet in favor of allowing a group of hunters (mostly Ducks Unlimited members) to kill birds there for several days. Our entry would be considered "molesting a hunter," which is against our laws. Obviously I was greatly disappointed for my group! We had not discovered this schedule because we would never have dreamed that killing migratory waterfowl would happen in a refuge where those birds had been purposely attracted with cultivated food. This was called baiting when I was a young fellow.

My dilemma is the dichotomy. How on Earth could we decide that the word "refuge" (safety from pain and danger) would apply to a place ever reserved for those who would kill the inhabitants? Why not rename the place "Mattamuskeet Wildlife Management Area"? It is confusing, to say the least, how those interested in preserving wildlife would condone killing them in a place originally intended to protect them. I have no problem with hunting, but I can't see the sportsmanship in this case.

Julien B. McCarthy
Brown Summit

***Greg Jenkins:** The tradition of hunting and fishing at Lake Mattamuskeet goes back to the times of native peoples — well before the lake was a national wildlife refuge. Hunting is by permit only and is carefully managed as a way to prevent overpopulation of various animal species. The point about the word "refuge" is valid; however, national wildlife refuges across the country offer hunting opportunities, so the practice is consistent and well established. It is always a good idea to call before visiting a refuge, especially in the case of Mattamuskeet [(252) 926-4021], where other activities such as dredging may limit access. We will follow up at a later date about many of the interesting things occurring at the lake.*

The True Value of Land?

I am writing in response to the reader letter entitled, "Not Fond of Ponds" in the Oct. 2009 issue. The author of that letter as well as many North Carolinians have a misguided and often self-motivated perspective of how we should view our land. Now more than ever we should reevaluate our perspective. Rather than viewing our land as a commodity, we should think more about the context of our family farms as one piece of a larger landscape that we are all collectively responsible for protecting.

Sure, as landowners we should be entitled to the income produced by commodities such as hardwood timber. However, I think we have a duty to be more responsible with our land and use more foresight in conserving native ecosystem health. Our farmland has a much greater value that extends far beyond our back pockets at this moment in time.

Landowners with bottomland hardwood forests and/or beaver swamps should consider more progressive means of generating income from their land. Conservation groups, land trusts, and various state and federal programs often pay big bucks to protect such land through permanent conservation easements — sometimes more than one could ever get from a one-time timber sale. Consider taking your land out of production (whether agricultural use or active timber management) with a permanent conservation easement and help preserve our natural heritage by protecting our stream and wetland ecosystems, beavers or no beavers.

Richard Andrews
Raleigh

write us

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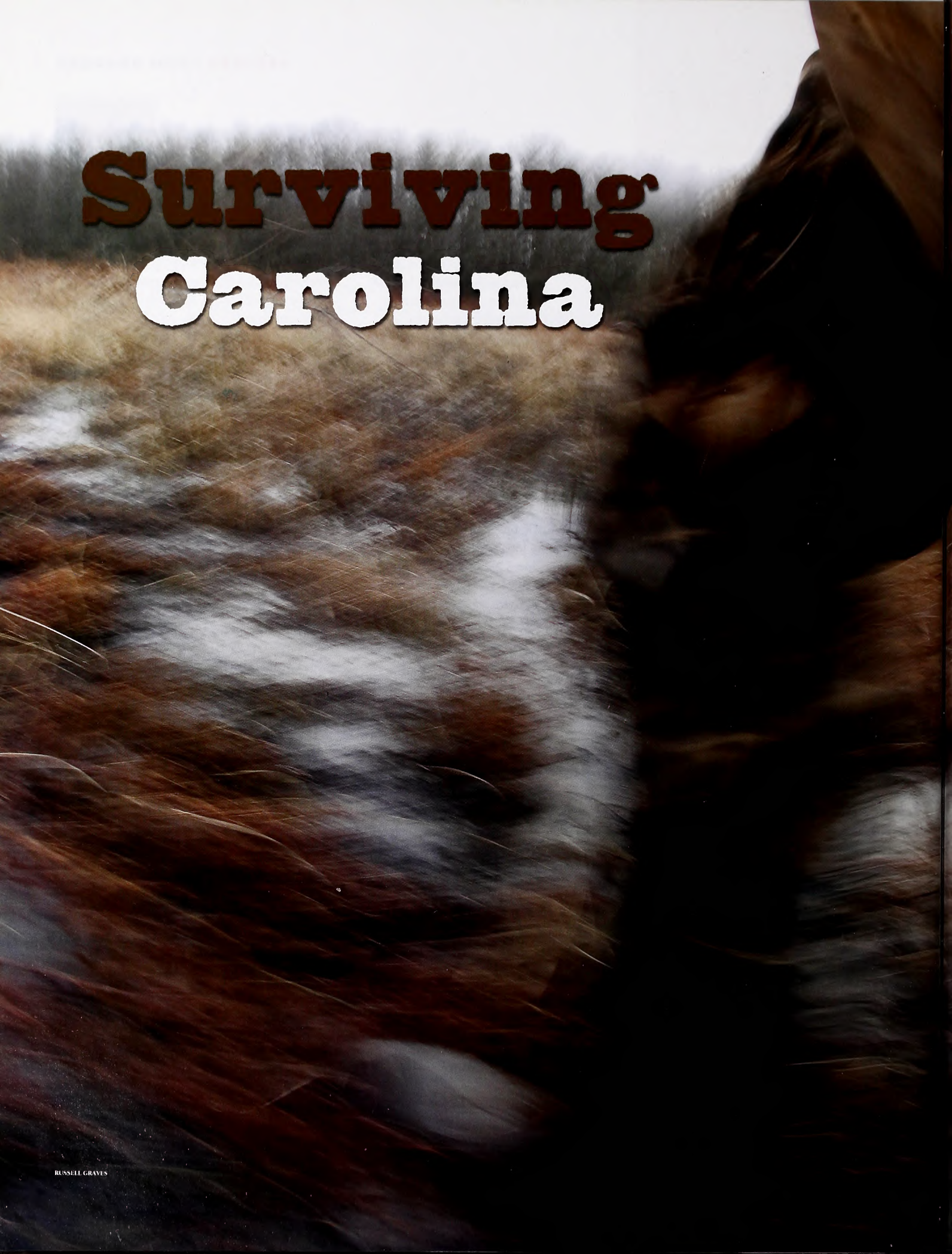
Surviving Carolina



RUSSELL GRAVES

When you are in deep trouble in the deep woods, or wet and cold with no chance of getting home before dark, these emergency tactics could save your hide.

written by T. Edward Nickens
illustrated by Gary Palmer

The chances are pretty good that you will never need to make a fire bed in order to survive a frigid North Carolina night. But the chances are even better that, if you need one, you'll sure wish you knew the ropes.

In our neck of the woods, survival skills don't really require that you be able to snare a squirrel or forage wild edibles. But you may be stuck in the woods on a bitter cold night. Or tossed off the boat on the way to the duck blind. Or lost in the middle of 10,000 acres of rough mountain country. That's when you'll wish you knew that duct tape is an excellent fire starter. And that superglue can close a ghastly wound.

Here's a cheat sheet of survival skills tailor-made for the kinds of rough spots a North Carolina hunter, angler or boater might have to navigate. None take superhuman strength. There's not a desert solar still on the list—just a few tricks you will be happy to have up your sleeve if ever you're in a serious outdoors pinch.

These aren't games to play while backyard camping. Most are emergency tactics to use if you're in serious trouble and need to stay alive until you can find your way back to safety—or someone can find you.

MAKE IT THROUGH THE NIGHT

Six Crazy Fire Starters. Need fire but there's not a flame to be had? Or perhaps you're down to your last match and a pile of wood wet enough to drink. Here are a half dozen unorthodox ways to tease a flame into a fire when the going is cold, wet and getting dark fast.

To start a fire:

Bullet and rag. Remove half the powder from a rifle cartridge and pour it into dry tinder. Plug the cartridge with a bit of frayed, dry cloth; place it in the gun chamber, and fire. Retrieve the burning cloth and use it to ignite the powder.

Bullet and spark plug. Remove the powder from a shotgun shell. Moisten it with a few drops of gas. Remove the spark plug from an outboard motor but keep the spark plug line connected. Hold the firing end of the plug near the powder and turn over the motor.

Battery and steel wool. Connect the terminals of a 9-volt transistor battery with 0000 steel wool, and the steel wool will ignite with a flame hot enough to start a well-laid fire.

To build a fire:

Duct tape. A fist-sized ball of loosely wadded duct tape is easy to light and will burn long enough to dry out tinder and kindling.

Inner tube. Three-inch strips or squares of bicycle inner tube burn with a rank, smoky flame hot enough to dry small kindling. No bike? Try the rubber squares in a wader patch kit (don't forget the flammable patch glue) or a slice from a boot insole.

Beer can and gas. Pouring gasoline on wet wood rarely results in more than a flare-up. Instead, cut the top off a soft drink or beer can, bury it so that the rim extends an inch above the ground, and fill it with gas. If you can't cut the top off, fill the can halfway with gas and place it on its side so the open tab is on top. Stack a tepee of wet kindling over the can and light the gas.

Fire and Ice. Now you've done it. Gone through the ice or over the bow or into a blizzard. Whatever your story, you need fire and you need it fast—before your fleece and fingers freeze. Let's assume you're not a complete moron: You have a workable lighter. Here's how to spark an inferno no matter how much snow is on the ground.

Start busting brush. You'll need a two-layer fire platform of green, wrist-thick (or larger) branches to raft your blaze above deep snow cover. Lay down a row of 3-foot-long branches, then another perpendicular row on top. Stay away from overhanging boughs; rising heat will melt snow trapped in foliage.

Lay out the fuel, and don't scrimp on this step. Collect and organize plenty of dry tinder and kindling and twice as many larger branches as you think you'll need. Super-dry tinder is critical. Birch bark, pine needles, wood shavings, pitch splinters, cattail fluff and the dead, dry twigs from the sheltered lower branches of conifers are standards. Place some tinder between your hands and rub vigorously to shred the material. You'll need a nest at least as large as a ping-pong ball. Pouring rain and snow? Think creatively: Dollar bills, pocket lint, fuzzy wool and a snipped piece of shirt fabric will work.

Plan the fire so it dries out wet wood as it burns. Place a larger branch or dry rock across the back of the fire and arrange wet wood across the fire a few inches above the flame. Don't crisscross; laying the wood parallel will aid the drying process.

Stay Warm on a Cold Night. Here's the three-part drill for getting warm, and staying warm, on a night as cold as a Donald Rumsfeld hug.

Prep time. Each morning, spread your sleeping bag out in the sun to dry accumulated moisture. At day's end, fluff up your sleeping bag to restore its full loft as soon as you put up the tent. A half hour before bedtime, toss a bottle of heated water into the foot of your bag.

Hit the sack. Don't down a big slug of hot chocolate at bedtime. You'll regret it during your 2 a.m. bladder dash. Instead, eat a snack before you turn in to generate body heat from digestion, and warm your body by pounding out a few jumping jacks or a short, brisk walk. Pee right before you get in the tent, whether you think you need to or not. Zip your jacket around the foot of your sleeping bag. Sleep with your face exposed, not in the bag, to reduce moisture accumulation from your breath.

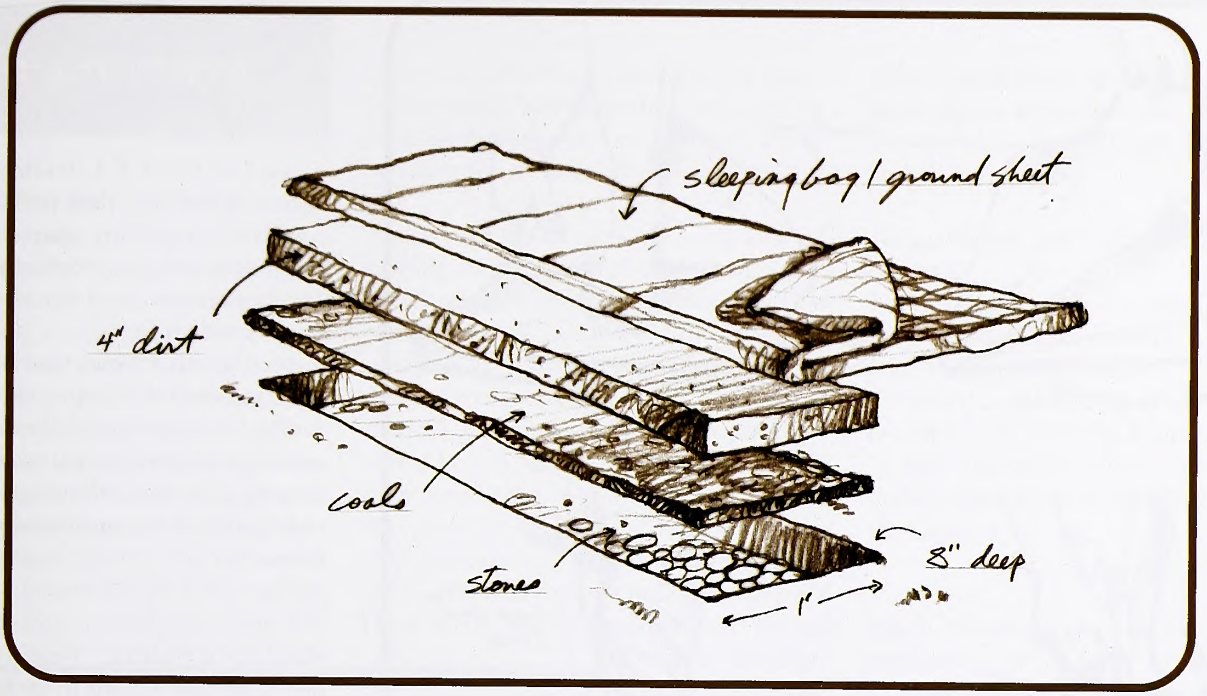
After midnight. If you wake up cold, eat a small snack to stoke the fires. If you gotta go, go. Your body is using precious energy to keep a full bladder warm. Take a whiz and it'll feel like you've pulled a quilt over your body. You did bring a pee bottle into the tent, right? You will next time.

Make a Fire Bed. Cold enough to freeze whiskey and you're stuck in the woods sans a bag? Make like a pot roast and construct a lifesaving fire bed. Scrape out a gravelike trench in the dirt about a foot wide and 8 inches deep. Line it with very dry egg-sized to fist-sized stones, if available. (Wet rocks from a stream or lake can explode when heated.) Next, burn a hot fire into coals and spread a layer in the trench. Cover with at least 4 inches of dirt and tamp down with your boot. Wait one hour. If the ground warms in less than an hour, add more dirt.

Now spread out a ground sheet of canvas, plastic or spare clothing. Pine needles or evergreen leaves will work in a pinch. Check the area twice for loose coals that could ignite your makeshift mattress. Ease onto your fire bed and snooze away.

FIRST AID

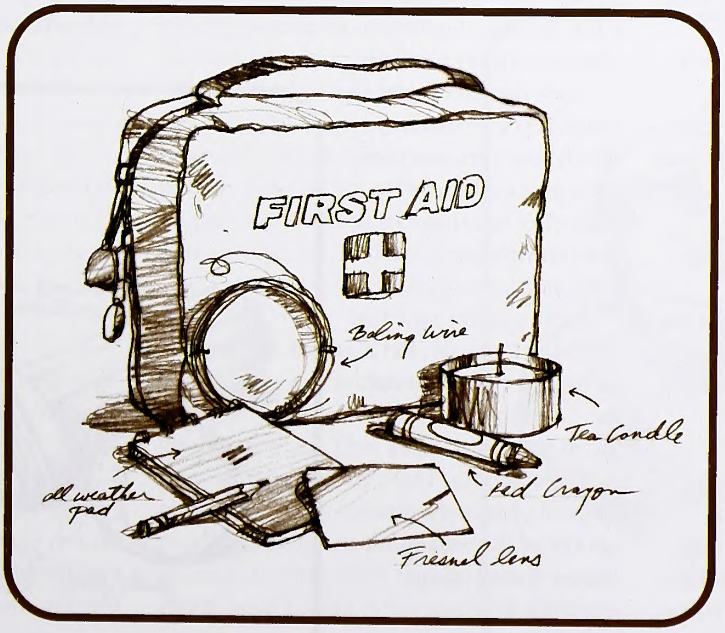
Stitch with Superglue. The so-called superglues are all branded formulations of cyanoacrylates, which were used during the



Vietnam War to close wounds and stem bleeding in the field. A medical formulation called Dermabond uses a slightly different chemical composition that minimizes skin irritation, but as many a hunter, angler and knife maker will attest, plain old superglue (Super Glue, Krazy Glue, etc.) will hold a cut together better than a strip bandage, and instances of irritation are rare. To keep it sterile, always use an unopened tube of glue. Irrigate the cut and clean it, then pinch it shut. Dab a drop or two of superglue directly on the incision, then spread it along the length of the cut with a clean applicator such as a toothpick or strip of plastic. The bandage is watertight and will seal out infecting agents.

Supercharge Your Survival Kit. Think you have all your bases covered? See if you have room for a few of these low-volume lifesavers.

Tea candle. The longer-burning flame will light wet wood.
Trick birthday candles. The wind can't blow them out.
Surgical tubing. Use it as a straw to take water from shallow seeps, as a tourniquet, or to blow a spark to flame.
Unlubricated condom. The best emergency canteen made.
Baling wire. If you can't think of 10 ways to use this, you're not an outdoorsman to begin with.
Rite in the Rain paper. How else are you going to leave a note for rescuers in a howling blizzard? A 3-by-5-inch notepad is a paltry $3.25 from www. riteintherain.com; (253) 922-5000.
Red crayon. Mark trees as you move, and use it as a fire starter.
Small Fresnel lens. The size of a credit card, it'll start a fire with the sun. Brunton packages one with a floating-disk compass for only $8; www.brunton.com; 1-800-443-4871.
Antibiotic baby wipes. Stave off infection with a single-use packet.



Read to Live

Further reading about surviving difficult situations outdoors:

"The Worst-Case Scenario Survival Handbook," by Joshua Piven and David Borgenicht, Chronicle Books, 1999.

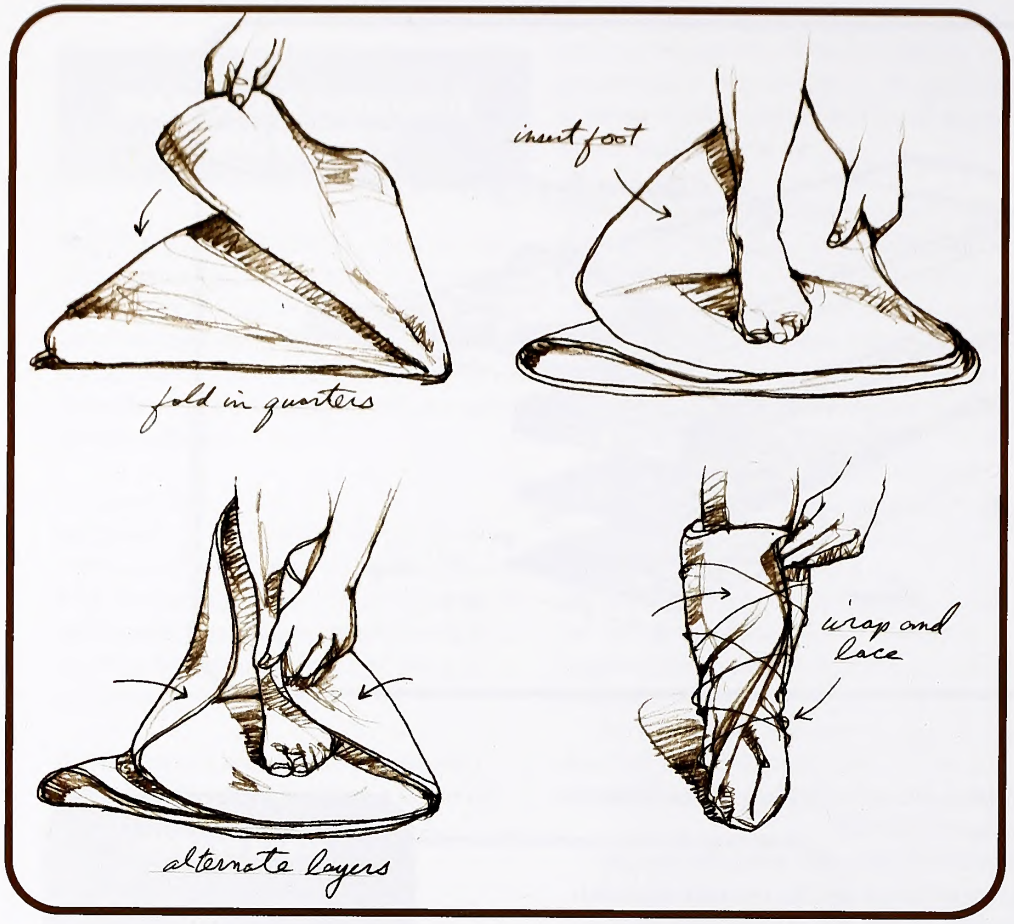
"Special Forces Survival Guide," by Chris McNab, Ulysses Press, 2008.

"When All Hell Breaks Loose: Stuff You Need to Survive When Disaster Strikes," by Cody Lundin, Gibbs Smith, 2007.

"SAS Survival Handbook: How to Survive in the Wild, in Any Climate, on Land or at Sea," by John Lofty Wiseman, Collins, 2004.

"Camping and Woodcraft: A Handbook for Vacation Campers and for Travelers in the Wilderness," by Horace Kephart, University of Tennessee Press, reprinted 1988.

"U.S. Army Survival Manual: FM 21-76," Department of Defense, 1970.



Save Your Toes. Your toes and feet are the first to fail you in frigid survival conditions. Keep them intact, and in use, with these makeshift mukluks.

Scrounge up a piece of flexible insulating material that you can do without—a piece of sleeping pad, an extra fleece vest, even carpeting from the boat that turned over. Cut it into a circle about 36 inches across. You'll also need spare lacing and, if you have it, something to serve as an outer shell—part of a space blanket, plastic tarp or even pants legs cut from spare clothing.

- Fold the circle of insulation into quarters.
- Move one layer of the insulation aside, and insert your foot. There should be a single layer of insulation at the heel.
- Alternate the remaining layers of insulation around your foot and leg.
- If you have it, slip the outer shell over the insulation. Crisscross the lace to tie firmly, or tie the lace directly over the insulating layer. Duct tape works great, too.

Survive a Capsize in Cold Water. Cold water kills weak swimmers, strong swimmers, the fit and the slobs. And it kills in surprising ways. An adult has a 50-percent chance of surviving for 50 minutes in 50-degree water. When you're going overboard in frigid water, your first challenge is simply to survive long enough to have to worry about hypothermia.

Cold shock. The first danger is known as cold shock. Hit cold water quickly and your body takes a few involuntary gasps of breath followed by up to three minutes of hyperventilation. You can literally drown while floating, before you even have the chance to freeze to death.

Keep your face out of the water. If you're in a wind-blown lake, turn away from the waves and spray. If you're not wearing a PFD, float on your back until you catch your breath.

Don't panic. Know that cold shock passes after a minute or two. Only then can you think rationally about your next steps.

Hypothermia. The more of your body you get out of the water, the better. Crawl up on anything floating.

The more you flail around, the more your body cools off. Unless you plan to swim to safety, stay still.

Assume the H. E. L. P. (Heat Escape Lessening Posture). Hold your arms across your chest and firmly against your sides, and pull your legs up toward your chest. This buffers the core areas of your chest, armpits and groin.

Find your hat. Cover your head and any other exposed skin to prevent heat loss.

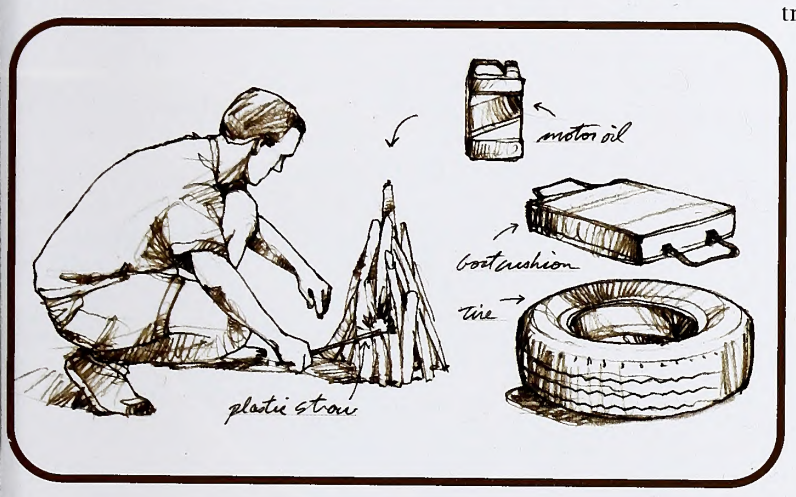
Float or swim? Your ability to swim is severely hampered in cold water. Swimming increases the rate of heat loss up to 50 percent. It should be considered a last resort for rescue.

Replace a Filling. No, it's not life or death. But lose a filling in the backcountry, and you might wish you were dead. A dental first-aid kit is tiny and weighs next to nothing, so put one together and toss it in your backcountry bag. At a drugstore, buy dental floss, dental wax, cotton pellets, a temporary filling material such as Tempanol or Cavit, a small bottle of oil of cloves and the smallest pair of tweezers you can find. Everything but the oil of cloves should fit inside a waterproof match case.

To replace a filling, place a few drops of oil of cloves on a cotton pellet. Be very careful, because oil of cloves can burn mouth and tongue tissue. Use tweezers to place the medicated cotton in the hole in the tooth, then tamp down with a blade from a multitool. Cover with the temporary filling material and tamp down. Scrape away excess material before it hardens.

LOST AND FOUND

Signal with Smoke. Putting up a massive plume of smoke, quickly, can attract rescue attention better than any other method. Two basics: Don't waste energy and fuel maintaining a signal fire, but keep several ready to light when rescue planes are spotted. A group of three burning fires is recognized as an international distress signal. And don't waste matches by trying to light a signal fire with a single match. Use a match to ignite a longer-burning super-match. Look around. Soda straws, plastic spoons, strips of rubber and twists of duct tape will all burn long and hot. Once lit, bring it to bear on the signal fire.



Black smoke is better than white, because it won't be viewed as a campfire. Test green vegetation to make sure it produces plenty of smoke. To really pour out black smoke, feed your blaze with anything petroleum-based, such as tires, engine oil, oily rags, truck floor mats and boat cushions.

White smoke might be needed in country covered with large swaths of dark conifers. Feed wet foliage into the fire to produce white smoke. To make a large, billowing plume, build a large fire and then nearly smother it with wet leaves or grass.

Take a Back Bearing. *What it is:* A back bearing is the direction 180 degrees from the bearing of your direction of travel.

What it does: On one level, it simply gives you a compass direction to follow to return to your starting position in case you need to retrace your route. More important, it can correct lateral drift off your intended direction of travel, which is what results each time an obstacle—a tree, a thicket, a cliff—forces you to move off your intended line.

How to work it: Once you have your forward bearing, turn around 180 degrees and take a back bearing. Remember it in case your compass bezel turns accidentally, then reset the compass for your forward bearing. (Say you're moving in a direction of travel of 45 degrees, or northeast. Your back bearing would be 225 degrees.) As you move toward your destination, occasionally turn around and point the direction-of-travel arrow on your compass back to your last location. The white end of the compass needle should point there. If not, you can retain a correct line of travel by moving until the needle lines up.

Hike Off Course. Deliberate offset is the degree to which you purposely veer off a compass bearing. Say your truck is parked on a logging road that runs east-west. Often, it's very difficult to walk a straight line in irregular cover. Instead of trying to walk a straight compass bearing to the truck, travel 10 degrees to one side. Each degree of offset will move your arrival about 20 yards to the right or left for each 1,000 yards traveled. Now you'll know whether to turn right or left at the logging road to hook it back to the truck.

Signal for Help. The best commercial signal mirrors are made with aiming devices. That's of great comfort to the 38 hunters and fishermen smart enough to own one. But there are ways to aim a jerry-rigged signal mirror—aluminum foil wrapped neatly around a card, or the shiny interior surface of a can, or a car's rearview mirror—that will work well enough to get you home alive.

Target: Moving object such as an airplane or a boat

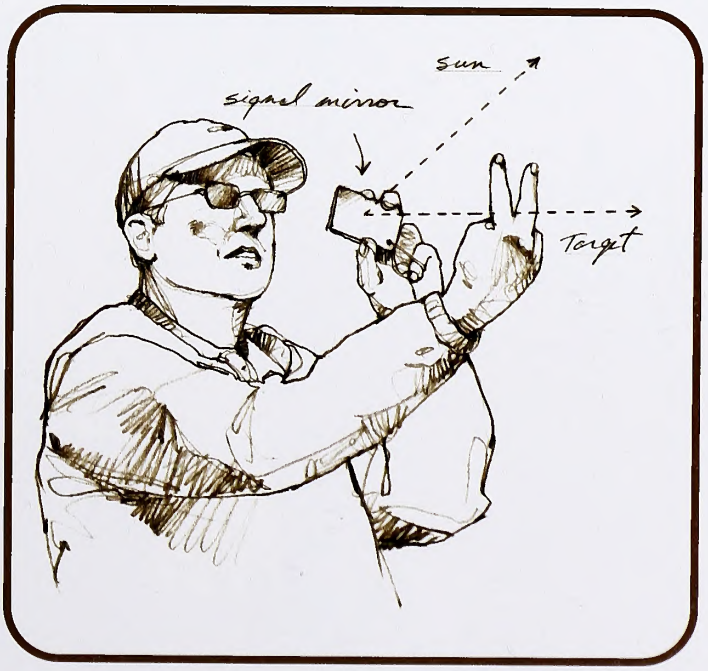
1) Hold the mirror in one hand and extend the other hand in front, palm facing toward you, with fingers spread.
2) Move the extended hand until the target rests in a V between two fingers.
3) Move the mirror so reflected sunlight flashes through the V and directly onto the target.

Target: Stationary object such as a structure or person

1) Drive an aiming stake chest-high into the ground, or choose a similar object such as a broken sapling or a rock.
2) Stand so that the target, top of the aiming stake and top of the signal mirror are in a straight line.
3) Move the mirror so that reflected sunlight flashes from the top of the aiming stake to the target.

If the outdoor gods are with you, you'll never have to use any of these tips. But make like a Boy Scout and be prepared, and one or more of these tactics could save your life. ◆

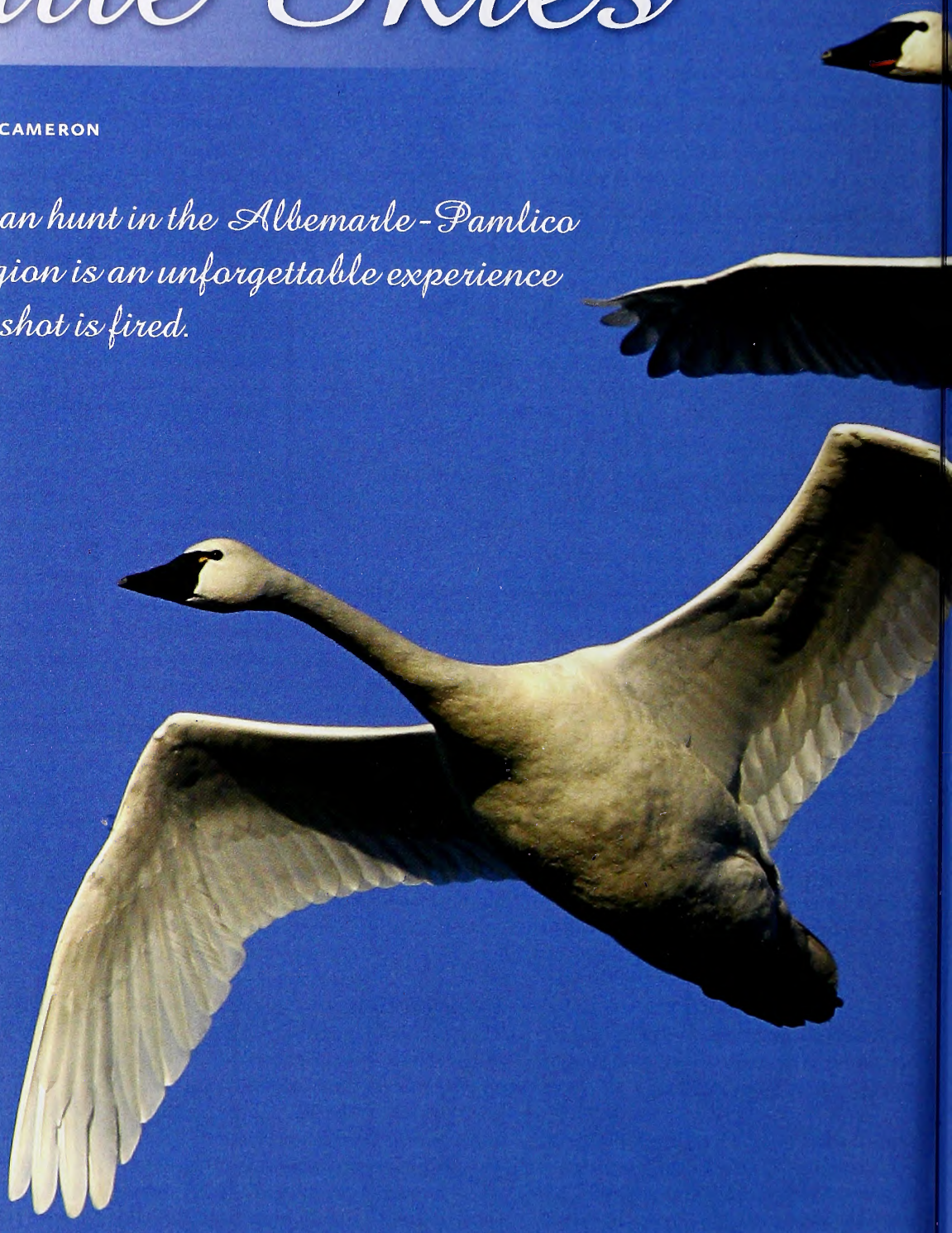
T. Edward Nickens is an editor-at-large for Field & Stream *and a longtime contributor to* Wildlife in North Carolina.



White Skies

WRITTEN BY JAMIE CAMERON

A tundra swan hunt in the Albemarle-Pamlico peninsula region is an unforgettable experience well before a shot is fired.



TODD PUSSER

Torrential rains in the wee hours of the morning had left rural Beaufort County's irrigation ditches nearly full. That did not deter the hardy group of waterfowlers from struggling into neoprene chest waders and jumping right in. They had traveled several hours through the darkness and the downpours to this place, just a mile from Pocosin Lakes National Wildlife Refuge and the shores of Pungo Lake, to experience the sights and sounds of one of the most unique hunts in the United States.

Sunrise illuminated the inky black squall line retreating to the west as an ethereal chorus of tens of thousands of roosting tundra swans floated across the cold January sky. At 7 a.m., the first loose flocks of swans rose from the lake to disperse across the vast agricultural fields that surround the refuge to feed on spilled corn and grain left over from the autumn harvest, and the emerald blades of winter wheat carpeting the remaining farmland. Many of the birds made their way across the field where the hunters crouched behind a spread of some five dozen snow goose silhouettes and four full-bodied swan decoys. To add depth to the deception, 30 or so "Texas rag" decoys (essentially white plastic bags threaded onto thin bamboo dowels) luffed tantalizingly in the early morning breeze.

"Don't shoot for the first half hour or so," Ken Brennan cautioned the group. "Let's just sit for a while and watch the spectacle."

Brennan, who lives on Harkers Island in Down East Carteret County, was the hunt's organizer and de facto guide. By some quirk in the natural order, he was born among the hardwood ridges of Pennsylvania but, after a stint in the U.S. Marine Corps at Air Station Cherry Point, found his true home amid the pocosins, creeks and tidal marshes of eastern North Carolina. A consummate hunter, trapper and fisherman, Brennan knew the potential reward for fighting the temptation of an itchy trigger finger can be the most unforgettable morning in a waterfowler's life.

Following his advice would prove easier said than done. Minutes later, a dusky-headed immature swan from one of the first low-flying flocks peeled off and landed amid the decoys, just 35 yards from where the hunters hid themselves behind dried palmetto fronds. As the young swan walked casually among the two-dimensional cutouts and swaying rags, more birds altered course to give the spread serious consideration.

Thirty minutes into the hunt, more than 100 tundra swans had passed within easy shotgun range, leaving the group's four special-harvest permit holders in varying stages of awestruck reverence and knee-knocking anticipation. Finally, the sight and sound of so many birds drove Brian Degan of Beaufort out of his crouch, and he swung his 12-gauge pump gun on an incoming swan with cupped wings and feet down. In response to a single, well-led shot, the immature swan folded neatly and hit the muddy ground with a solid thump.

Even as Degan crawled out of the ditch to retrieve his bird, more swans winged overhead. By 8:45 a.m., the party's four harvest permits had been filled, but no one considered leaving the field for an early start on the drive home. Brennan's predawn optimism had become reality across the stormy winter sky, as flocks of swans continued their unhurried evacuation of Pungo Lake.

At around 10 a.m. the flights slacked off, and the hunters finally emerged from the rain-filled ditch to pick up their decoys. By then, the general consensus among the group set the number of birds that had flown over the field that morning at around 1,500. Almost a third of them had come within shotgun range.

NATE BACHELER

NATE BACHELER

NATE BACHELER

The traditional method for calling tundra swans is by mouth, imitating the swans' travel vocalization. Hunters are encouraged to hold off shooting for the first few minutes after the swans begin to fly in order to watch the magnificent show.

Seventy-seven thousand swans a-swimming

During the winter of 2007–08, N.C. Wildlife Resources Commission biologists estimated the number of tundra swans in the northeastern counties at an astounding 77,000 birds—a figure representing more than one-third of the species' global population.

As their name implies, tundra swans *(Cygnus columbianus)* spend the breeding season in North America's treeless arctic zone, where they nest beside lakes and ponds, feeding on aquatic vegetation. Weighing 8 1/2 to 23 pounds, with a wingspan of more than 5 feet, tundra swans are North America's third-largest waterfowl species, behind only trumpeter swans and non-native mute swans.

Tundra swans are managed as two distinct populations, based on segregated breeding, migration and wintering habits. The western population breeds along Alaska's western shore and the Aleutian Islands and winters primarily along the Pacific coast from Vancouver Island to southern California. The eastern population breeds from the North Slope of Alaska eastward across the Canadian arctic to Baffin Island and western Quebec and along the western and southern shores of Hudson Bay. These birds winter in largest concentrations in the Chesapeake Bay region and coastal North Carolina.

From 1999–2004, the Wildlife Commission, in cooperation with other state agencies in the Atlantic Flyway that deal with wintering swans, conducted research to gain a better understanding of annual survival, migration timing, winter movements and key breeding areas. Wintering tundra swans were captured in baited areas using rocket nets. After their age and sex were determined, the swans were fitted with leg bands and neck collars. Biologists fitted some of the birds with VHF radio or satellite transmitters to track their movements in real time.

Doug Howell, waterfowl biologist with the commission's Division of Wildlife Management, Surveys and Research Section, said swan hunting in North Carolina (and Virginia—currently the only other Atlantic state that allows it) is directly linked to the species' Eastern Population Management Plan. "With the passage of the Migratory Bird Treaty Act in 1918, all hunting of tundra swans was closed and remained closed until 1984, when Wildlife Resources Commission biologists, working with the U.S. Fish and Wildlife Service, proposed a limited experimental season in North Carolina," Howell said. The number of permits issued that season was 1,000. In subsequent years, the number fluctuated from as many as 6,000 to as few as 4,960. Since 1997, the Wildlife Commission has issued 5,000 tundra swan permits yearly to both resident and out-of-state hunters—a level of harvest that, for now, has proven to be sustainable and within the guidelines of the management plan.

Experienced guides, unaware swans

For many years, hunters who have been lucky enough to draw a swan tag have enlisted Outer Banks Waterfowl guide services in Kitty Hawk to help them fill it. Capt. Victor Berg said that, with the advantage of his 30 years of experience, plus shoreline and open-water blinds strategically located in Pamlico, Albemarle and Currituck sounds, his clients often take swans during hunts for other species. "In my area, it often takes only three to five swan decoys on the upwind side of the spread to bring them in," he said. "Some of my guides with open-water blinds will put out more decoys to represent a larger group of swans, but I'm usually in the marsh facing out, where it isn't necessary."

Berg said the number of swans in the sounds usually peaks around Christmas and holds steady through the end of the season, but the birds in the early season tend to be more naïve.

"It's pretty awesome to have swans come in to the decoys, but I have to emphasize to my hunters the importance of waiting for the birds to get in range," he stressed. "For hunters who aren't used to it, it's tempting to take a shot when the birds are still 75 to 80 yards out—they just look so big."

And though big, mature tundra swans, with their snow white plumage, make for

an impressive trophy, Berg said he tells hunters who aren't planning to have their bird mounted to aim for the gray-necked immatures. "Because swans travel together in mated pairs and family groups, I suggest (to nontrophy hunters) taking immature birds," he said. "That way, you don't break up the pair, and the immatures are more tender and better eating."

Half of the swan hunts guided by Aaron Mathews, who runs Fourth Generation Outfitters out of Aydlett, take place in winter wheat fields in Currituck, Camden and Pasquotank counties. His decoy spreads are usually set to attract both tundra swans and snow geese and include 700 to 1,000 full-body snow goose shells and Texas rags. He also puts out five to 12 custom-made magnum swan decoys.

"We drive around the day before a hunt to find the fields the swans are feeding in. Usually, in my area, that's winter wheat, and that's where we'll set up in the morning," Mathews said. "We generally start seeing birds around 7 to 7:30 a.m. as they leave their roosting areas on the sounds, and they'll fly until around noon."

As the 2008 World Swan Calling Championship title holder, Mathews adds his own voice to the hunt. Tundra swans have several distinct vocalizations, but the most common, and easily imitated, is the musically hollow "who-hooo-hoo" call the birds use to remain in contact as they travel. "I know there are call makers out there making swan calls, but I don't know of anyone in North Carolina who uses one. In my family, it's been passed down to call by mouth. It's what we've always done," he said.

For guns and ammunition, Mathews recommends 3-inch and 3 ½-inch shells in 12 gauge, loaded with either BB or BBB steel shot, or 2s and 4s in nontoxic Hevishot, bismuth or tungsten. "It's a big bird," he said. "So come prepared to kill a big bird."

Both Berg and Mathews agreed that, aside from the hunter's doing his job by putting quality shots on the target at reasonable ranges, filling a swan tag in eastern North Carolina usually isn't all that difficult. "You can get swans to come in to 1,000 decoys, and you can get them to come in with just one decoy," said Mathews. "The key is being in the place they want to be."

As interest in tundra swan hunting has grown, so too has North Carolina's status as the premier destination to harvest one of these magnificent birds. As long as biologists continue to monitor population trends and the effects of hunter harvest, the Tar Heel State will likely continue to be a magical place for waterfowlers who seek an unforgettable hunt. ◆

Jamie Cameron is a freelance writer living in Stella, an avid hunter and an occasional contributor to WINC.

TODD PUSSER

TODD PUSSER

NATE BACHELER

Apply for a swan tag

Tundra swan hunting in North Carolina requires hunters already in possession of a valid N.C. hunting license to apply for one of the 5,000 special permits/tags awarded in the annual random drawing in early October. Successful permit holders must affix their tag immediately to the harvested bird and fill out a questionnaire stating their hunting effort and success. The nonrefundable application fee is $10. Those who wish to apply for a permit can do so with one of the approximately 1,200 Wildlife Service Agents in the state or download an application at the Wildlife Commission Web site, www.ncwildlife.org. You can see more information regarding swan hunting permit applications as well as other permit hunting opportunities by reviewing the annual *North Carolina Inland Fishing, Hunting and Trapping Regulations Digest*, available online or free of charge at any Wildlife Service Agent.

The TRUTHINESS Problem

Written by Bruce Ingram
Illustrated by Jackie Pittman

Think you know the truth about black wolves, mountain lions and parachuting rattlesnakes? THINK AGAIN.

According to comedian Stephen Colbert, truthiness involves things that we claim to know are true without regard to evidence, logic or facts.

In my travels in North Carolina, I have come across all kinds of examples of truthiness in relation to fishing, hunting and wildlife in general. Indeed, well-meaning folks who love the outdoors seem to have a propensity to believe in all sorts of things — beliefs that have no basis in fact.

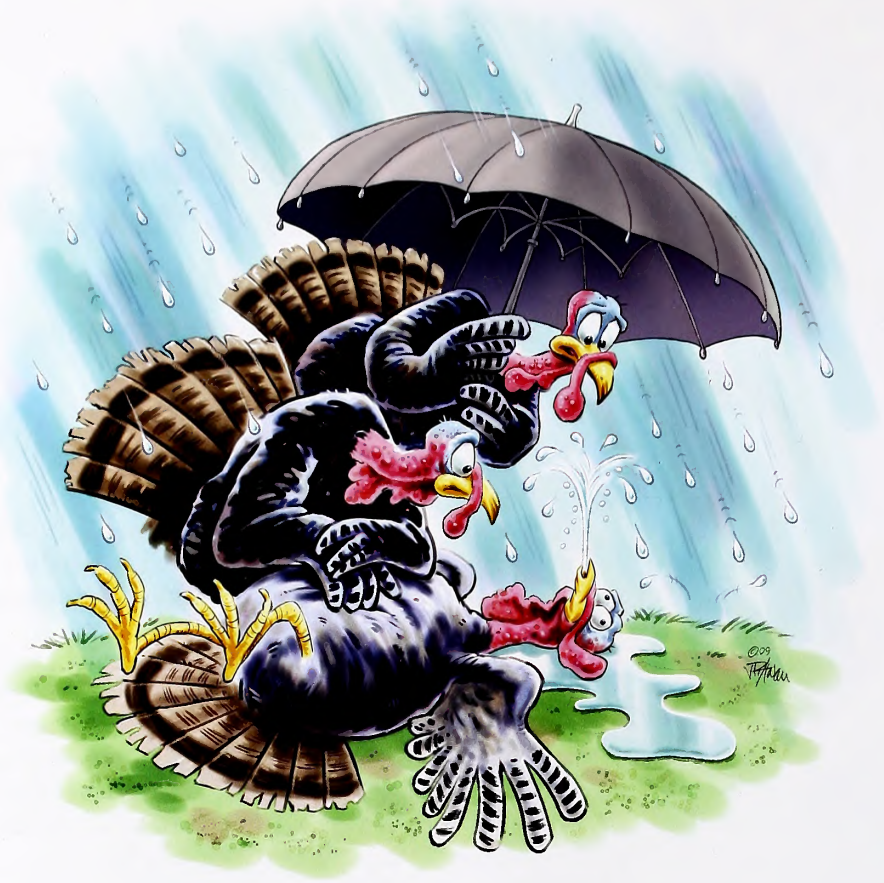
Deer and turkey enthusiasts are not immune to this affliction. I asked Evin Stanford, who is in charge of managing these two big-game animals for the N.C. Wildlife Resources Commission, to debunk some of the worst examples of truthiness pertaining to whitetails and turkeys.

Belief: Turkeys are so stupid they will look up when it rains and drown.

Fact check: Utterly false, says Stanford.

Belief: Tryptophan is a chemical in turkeys that causes people to become drowsy when they eat the meat from these birds.

Fact check: False. "Although wild turkeys have slightly more tryptophan than domestic turkeys, and tryptophan in high doses can potentially induce drowsiness in people, the amount of tryptophan in turkeys is so low that it cannot have any effect on humans," says Stanford. "In fact, the amount of tryptophan in wild turkeys is on par with amounts in other foods." For more information, see www.nwtf.org/flyinghigh/thanksgiving_tryptophan.html.



BELIEF: Turkeys are so stupid they will look up when it rains and drown.

FACT CHECK: Utterly false.

Belief: Turkeys eat quail eggs and chicks.

Fact check: Utterly false, says Stanford.

Belief: Wild turkeys don't fly.

Fact check: "As most hunters know, this is false," says Stanford. "And, yes, adult turkeys do roost in trees."

Beliefs: Gobblers send forth jakes to see if the "coast is clear," and gobblers will crack open hen eggs to make hens want to mate longer in the spring.

Fact check: False, says Stanford.

Belief: Only dominant bucks breed.

Fact check: Though this was once thought to be primarily true, "recent research has shown that even young bucks often participate in breeding activities," emphasizes Stanford. (See Back Porch, Nov. 2009)

Belief: Once a spike, always a spike.

Fact check: Utterly false, says Stanford.

Belief: The moon phase determines the timing of the rut.

Fact check: "Research indicates that the timing of the rut is determined by the photoperiod—the length of daylight," Stanford explains. "The rut often occurs during the same time period each year. If it were driven by moon phase, the timing would vary by as much as a month."

Lastly, while I was in Alleghany County this past September, a hunter told me that albino deer should not be killed because American Indians held them sacred. It is true that many tribes believed that albino deer and other animals possessed mystical abilities, but is there a biological reason for not shooting an albino deer? The answer, of course, is no.

"There were many groups of Native Americans across the continent, so it's probably not accurate to lump all of them together and say all groups thought that albino deer were sacred," adds Stanford. "Although I have heard this myth before, I am not sure if it's accurate. There is no biological reason for not shooting an albino deer."

Coyote Myths

Last June in Buncombe County, someone told me that coyotes had eaten all the grouse in the area. At first, I thought I would let this falsehood slide, but I had to ask the following questions: "Do you mean to say that coyotes are entering overgrown thickets, rhododendron and laurel for example, and flushing grouse, or do they point them like bird dogs while other coyotes move in for the kill?"

Coyotes are not major or even minor predators of ruffed grouse. They are animals primarily of fields, agricultural areas and open woods, and grouse are inhabitants of clearcuts and copses. Perry Sumner, Wildlife Commission Surveys and Research Section manager for the Division of Wildlife Management, says that one of the worst current myths is that the state stocked coyotes, which, of course, it did not.

"Coyotes were here as long ago as the 1950s," says Sumner. "In the western part of the state, they arrived by natural migration. In the eastern part, coyotes were helped along by fox hunters releasing them or by having the animals escape from pens that were designed to keep them in but did not.

"The interesting thing is that coyotes will kill red foxes if they have the chance. It's a

One of the worst current myths is that the state stocked coyotes, which, of course, it did not.

territorial kind of thing for the coyotes to do, just as in wolf territory wolves will kill coyotes if they have the opportunity."

Ironically, says Colleen Olfenbuttel, the commission's bear and furbearer biologist, the coyotes' penchant to kill red foxes means that they have targeted one of the major predators of ruffed grouse, as well as of quail and rabbits.

Rattlesnake and Wolf Myths

The perverse belief that the Wildlife Commission secretly stocks certain animals is not restricted to coyotes. Numerous times, not only in North Carolina but also in Virginia, West Virginia and Tennessee (the other states in which I hunt and fish), I have had individuals tell me that their respective game departments are releasing diamondback rattlesnakes, often by airplane.

I always ask those people if they know who is in charge of positioning the parachutes on the rattlesnakes while they are in the plane and removing the chutes once the vipers touch down safely. And last year at an outdoors show in Charlotte, a man (in hushed tones) told me that the commission was releasing black wolves into the North Carolina mountains.

"We do not and have not stocked rattlesnakes!" says Brad Gunn, wildlife biologist and section manager for the comission. "Also, we are not stocking and have not stocked wolves of any color, including black. The U.S. Fish and Wildlife Service released red wolves on Alligator River National Wildlife Refuge during or around 1987, and there are reportedly more than 100 in that area now."

Fishing Myths

Myths are not limited to game animals, predators and reptiles. In Stokes County last summer, a fisherman told me that smallmouth bass organize themselves into schools and take turns blocking minnows while their fellow school members eat. Kin Hodges, District 7 fisheries biologist for the commission, says that he can't totally rule out this smallmouth behavior, but . . . "Although we've all seen small schools of smallmouth chasing schools of minnows, I doubt that they possess the mental capacity to organize themselves in that manner," he says.

To further expound on the mental abilities of fish, a recent article in *Fly Fisherman* magazine stated that research had indicated that trout have an IQ of about 6. To put this in perspective, the average human has an IQ of 100, and the IQ of an inanimate object is obviously 0. By inanimate I mean an object such as a chair, sofa or block of wood. A creature that is barely smarter than a block of wood is not prone to deep thoughts.

Two other fishing tales I have long heard are that when barn swallows or other swallows are flying, it means that the fish are active, and that the presence of herons means that fishing should be good in an area.

"I've also heard various stories about how bird activity can relate to fishing success," says Hodges. "I could possibly see some of these as being true, if the increased bird

To further expound on the mental abilities of fish, a recent article in *Fly Fisherman* magazine stated that research had indicated that trout have an IQ of about 6.

activity was related to an approaching weather front that would also kick-start the fishing." The problem I have with the heron story is that these birds often forage in areas with mud, sand or silt bottoms. Angling for any species of bass in areas like that is likely to be futile no matter how many great blue, green and other species of herons are in the area.

Hodges says that some misconceptions are so absurd that they are humorous.

"The funniest fish myth I've ever heard is that the hellbender is the male of the catfish," he says. "I don't know how widespread this is, but my co-workers in the western end of the state told me about it. Another good one I've heard is that fish eggs get introduced into new water bodies when rain falls.

"The logic is that fish eggs in ponds that already have fish in them evaporate along with the water and get deposited in different places when it rains. A more likely explanation for how fish get introduced into unstocked ponds would be that fish eggs can probably be brought in by fish-eating birds such as herons and kingfishers, or other animals that visit ponds to hunt or drink."

Hodges says he has also been told that warmouths are the result of a bass spawning with a bluegill. This is obviously false. Though sunfish can breed with each other to produce hybridized offspring, and different types of bass (largemouth, spotted and smallmouth) can breed with each other, it's impossible for a bass to produce offspring with a sunfish. At least in the wild.

Another myth that bass fishermen perpetuate is that bass eat plastic lizards because they don't like aquatic salamanders, since the salamanders eat bass eggs. Once again, consider the IQ of fish before you set much stock in this myth.

Hodges adds that yet another falsehood that comes from bass fishermen is that the wind blows around shad in lakes. It is true that fishing is often good along stretches of shoreline where a strong wind stirs the water. "I've heard anglers say that the wind blows in the shad, and the bass move in to feed on them," explains Hodges. "My guess would be that the wind action stirs up food items from the lake bottom, and the shad voluntarily move in to feed on these items."

Hodges said that one of the worst examples of truthiness involves fish stocking.

"Much of the angling public is still under the impression that stocking fish is necessary to have good fishing," he says. "This is true in some cases, such as stocking stripers into reservoirs where they can't spawn, or stocking trout into streams where they are unable to reproduce. But most of the species anglers complain about [bass, crappie, sunfish, walleye] are highly prolific spawners that reproduce successfully on their own.

"Stocking additional fingerlings on top of the offspring naturally produced by these species every year does not result in an increased abundance of adult fish. The exceptions would include situations where fish are stocked to rebuild a population depleted by a fish kill, or when a species is no longer able to reproduce because of competition from introduced exotic species. For example, walleyes not being able to reproduce once alewives are introduced into a lake."

Other Myths

Chris McGrath, wildlife diversity program coordinator in the Division of Wildlife Management, says that an example of truthiness that he hears all the time involves that perennial subject of myths, bats. Some people believe this mammal will swoop around and become entangled in a person's hair. "I've had several people relay such stories, and I cannot find any reasonable explanation for why bats would do that, but some speculate that hair spray or shampoo may attract insects, which in turn attract bats," says McGrath. "Alas, I can't say that I've ever put much stock in that happening."

A story that is part of American folklore is that yellow-billed cuckoos, which early settlers called rain crows, tend to make their call note (logically enough a "coo-coo-coo") when a storm or rain is approaching. McGrath says that authors Eloise Potter, James Parnell and Robert Teulings state in "Birds of the Carolinas": "There may be some scientific basis for this bit of folklore, because cuckoos apparently adjust the timing of their nesting effort to the temporary local abundance of suitable prey, which in many cases coincides with periods of rainfall." But McGrath doesn't have any personal knowledge to support or refute that statement.

Cougar Myths

I have saved the best, or the worst, of the examples of truthiness for last. Since the mountain lion became extinct in this region many years ago, people have been claiming to spot these big cats. David Sawyer, surveys and research program coordinator for the Wildlife Commission, weighs in on the subject of Carolina cougars.

"The NCWRC or 'state' has not stocked coyotes or mountain lions to control the deer herd; I have heard this rumor for both species," he says. "Most wildlife myths and rumors appear to come about by someone having knowledge of two or more events or activities [for example, increase in deer and appearance of coyotes, along with knowledge that the state has stocked other species in the past] and then attempting to make some sense out of the newest occurrence — that is, why the coyotes are here.

"They put two and two together and come up with five: The 'state' must have released them to control the deer. Rumors usually start out with somebody saying, 'Maybe the state released them,' then as the conversation spreads through the community, it becomes, 'I heard the state released them.'"

Sawyer says that because the Eastern cougar is on the endangered species list, any restoration effort would have to be carefully planned with the U.S. Fish and Wildlife Service, which has jurisdiction over federally listed species. There has been no such planning or restoration effort. The "state" has not attempted to cover up the existence of cougars; it simply has no documented evidence that they live in North Carolina.

According to Sawyer, the commission has had no documented evidence of wild mountain lions (cougars) in North Carolina since they were extirpated from the state. Documented evidence would include a live or dead animal, verifiable photographs, professionally verified tracks or DNA verification from hair samples or scat. Submission of samples would require a solid "chain of custody" to prove that the sample did indeed come from the wild in North Carolina and not from a captive animal or another location within the cougar's current range.

Sawyer says that there is no breeding population of cougars in North Carolina, and any animal found or observed here at this point in history would have to be an animal that either escaped or was released from captivity or a male cat that somehow managed to walk hundreds of miles from known populations only to fail in finding a female to breed.

But what about all those pictures that folks send in to the Wildlife Commission?

"Biologists occasionally receive pictures from the public, but the pictures either appear to be house cats or bobcats or are just too poor in quality to tell what the animal is," explains Sawyer. "Biologists also receive reports of cougar sightings. However, observations could be of many animals including house cats, bobcats, dogs, coyotes or bears, as most people state they saw the animal at a great distance, at night, or it was moving fast. It is possible a cougar could escape or be illegally released from captivity and then be observed, and the few cats handled over the years were obviously domestic escapees or releases, based on behavior or identification markings."

Olfenbuttel adds that one animal commonly mistaken for a cougar is a red fox infected with mange.

"Of the photos I have seen in North Carolina in which the photographer believes the animal is a cougar, I estimate that half turn out to be a mangy fox," she says. "The lack of fur makes the animal appear tawny, like a cougar, and the lack of fur on the tail makes it appear to be similar in shape and size to that of a cougar."

Over the years, I have even heard people claim that they have glimpsed black panthers. Once again, Sawyer has to debunk a myth.

"The only large cats that are frequently black are the jaguar and leopard, each carrying recessive or dominant genes for melanism, the opposite of albinism," he said. "Neither animal is native to North Carolina. In their melanistic form, both of these cats are frequently called black panther. As with cougars or any captive animal, it is possible that these cats could escape or be released from captivity and later be observed by someone.

"There is no black cougar known to science other than the possibility of a melanistic animal. However, I am unaware of the confirmed existence of a melanistic cougar ever occurring, and the odds against one being born are likely astronomical.

"When I was a district biologist," Sawyer said, "I experienced an increase in 'black panther' reports after the establishment of Charlotte's pro football team [the NFL's Carolina Panthers]."

The lesson learned from all these examples of truthiness? Perhaps this saying is appropriate: "Everyone is entitled to their own opinions, but not their own facts." ◆

Bruce Ingram is the author of four books on river fishing and floating, among them "The New River Guide" and "Fly and Spin Fishing for River Smallmouths." For more information, contact him at be_ingram@juno.com. Everything he writes is true.

Harmless Lies, POETRY and CHEESEBURGERS *All the Way*

In this small town, everyone is kin—in the woods, along the Catawba River and in the Claremont Café.

Written by Shari Smith & Photographed by Melissa McGaw

I don't keep up with decisions made by the boys in Raleigh as to deer season. When I come down the hill, ease over the railroad tracks, and through my windshield see the finest people I know gathered around the bed of a pickup truck parked behind the bank, across from the Claremont Café, I know the season opened on Saturday morning. They will have left grits and eggs waiting on the tables to come and stand, staring down, their hands shoved in the pockets of their camouflage coats or bib overalls, their shoulders pulled up to their ears to keep the cold from their necks. They will remark on size and age, ask as to location and time, remember aloud their own hunts, long ago or the morning before, and I will know that a deer is dead and it is worthy of a viewing.

The hand-painted sign out front says Claremont Café, but to locals it's the Pool Room, though there hasn't been a game of eight ball played there since 1970. It's where we go in this small Carolina town to stay up on news and eat grease the surgeon general swears will kill us all. Once a mule was ridden in one door and out the other, and there was also an unsolved robbery when someone stole the stovepipe. Never bothered to call the law. There is the occasional arms deal at the Back Table, and handmade skinnin' knives are often being admired at the counter. You don't have to be armed to eat there, but it's not an altogether bad idea.

Bob Winstead will unbutton the top of his blue jeans before he sits down to eat gravy and toast. As thin as Bob is and has always been, a meal at the Café can test the strength of denim. So tiny he has carried the nickname PeePee—no bigger than a baby chicken—since his working days in the furniture mills of Catawba County, Bob sits every morning at a table with Gary Sigmon and his wife, since she retired. If Bob is missing, he's off hunting. In days long past, Gary Sigmon outran the law in a gold '66 GTO, brought an insurance company to its knees with a can of spray paint and survived a near-death experience involving a septic tank and a John Deere, yet he eagerly awaits Bob's return, knowing there might be a good story to hear. Bob Winstead has always hunted, always fished and always worked. Retirement brought freedom to his schedule but little opportunity for porch sitting. He helps a brother with a broke-down engine or a son crossing his heart and swearing he does not know how that hole got in his daddy's boat.

Back Table regulars—(opposite page, clockwise from left) Mike Benfield, Glen Overcash, Sam Willis, Larry Hoke and Jim Bryant—gather at the Claremont Café for stories of hunts both new and old. Charles Connor (above left), better known as C-3, holds down his spot at the counter.

Bob and his sons put venison and fish in the freezers and on the dinner plates of neighbors all over Claremont, including my own. I've opened my door to find him standing over a cooler, offering enough to feed an army if I am willing to cut up and wrap, and I always am. He once belonged to a hunting club, a group of 10 or so, but now hunts with his boys, Robbie and Kelly, in the pines of Catawba County and just across the line into Virginia, their get-gone for the past some years. They hunt deer and turkeys when the seasons allow and fish the rest of the time. Most of the hunters in our part of the county will put their egos aside and admit that there may be nobody better in the woods than Robbie. He hits what he aims to hit and leaves what he should. Ask Bob if there is anything he always wanted to hunt but didn't, and his answer will be a wink and a smile and a draw on his pipe. "Yeah," he'll say, "but I forgot her name."

C-3, called so for the Charles Connors who came before him, will be on a Naugahyde stool at the counter, and we'll all be sworn to secrecy as to his presence, cholesterol and his longevity being a concern to his wife. He named his 300 acres Wood Duck Bend for the daily flight pattern of those birds from Lyle Creek to his pond. A hen made a home in his woodstove before he could get a cap on the chimney or a fire lit in the cabin he built there, close enough to hear the water running over rocks and around a beaver dam.

Dogs, quail and Audis

It wasn't family who brought him to the hunt but rather John Busbee and Roland Pope. C-3 walked the railroad tracks that cut through town with Mr. Busbee and his dogs when the broom straw was thick with coveys of quail and rabbits ran in every direction, lining up birds on a bale of straw in the back of his '78 Audi. The car, the quail and the old men are gone now. Mr. Busbee, a man so kind and good to people that he was forgiven for having been born in South Carolina, was fond of saying that young men hunt behind pointers and old men hunt over setters. We would see him at lunchtime, ordering cheeseburgers to go, taking them back to his corner drugstore, where in retirement he sat near the door and talked to folks coming in for prescriptions or birthday cards. His great-grandchildren are learning now the Busbee tradition of quail and grits and eggs on Christmas morning and

memories of Irish setters that were so much more than pretty redheads.

Mr. Busbee's favorite story was of traveling east near Statesville with C-3 and a borrowed dog not worth the time it took to feed him. With no quail and a sorry dog, the men were offered another dog, a better dog, and used him to find every bird in Iredell County. At the end of a day saved by a good nose, C-3 wanted to buy him. He wasn't for sale at any price, they were told by their host, the owner of the dog. "Aw, everybody's got a price," reasoned C-3, "and I'm willing to pay it." The man refused his offer of $200, then $300, and C-3, a man not partial to "no," offered another $100. The man thought for a minute and said he sure did hate to do it, but if C-3 was willing to part with $400 for a dog he'd seen hunt only one time, well then, he reckoned he would sell him, and C-3 nodded his head in the self-assured, damn-right confidence of a man who could buy most anything he wanted. He turned to Mr. Busbee and said, "Uh, John, you got any cash? I left mine back in Claremont," and for the 30 minutes it took to get home, Mr. Busbee owned a Brittany spaniel.

Some folks see dollar signs when looking at C-3, and it's true that his checkbook can buy him duck hunting in Alaska and Arkansas, where he swears they are lying about ivory-billed woodpeckers, and he's got himself a gas-guzzling, dualie truck and a shiny Breitling watch. But that same checkbook paid for the fancy bus with soft seats that took us on the four-hour drive to cheer for the varsity girls' basketball team that earned a spot in the regional championship game, and every now and then it answers a phone call from John Busbee's son at the drugstore when someone can't afford pills that keep a heart pumping good. Besides, C-3 knows that Breitling doesn't keep a bit better time than Bob Winstead's Timex. He just likes pretty things. It's why he married Edie.

His boy, C-4, chooses to sit at the Back Table with men much older than his 20 years. He plants food crops for deer and turkeys and tends to the wood duck boxes he has placed around the creek. He's determined to replenish the quail population of Catawba County by his own hand, calling his daddy from the pen to remind him of the need for another heat lamp. He spends as much time on a John Deere as he does in a study group at Appalachian State, eager to be back in a deer stand or duck blind. On the morning after Thanksgiving his seventh-grade year, the deer that would be his first stood within range as his daddy motioned for him to shoot. So nervous he believed the deer could see his breath, he decided to hold it until the deer was down, only it was C-4 who was down when he passed out due to lack of oxygen and fell to the floor of the stand. The deer splashed into the water of Lyle Creek, while C-3 said, "Give me the gun, Son," and spine-dropped him. Pulling the boy to his feet, he handed him the gun and said, "I think I missed. Get him before he gets gone," as C-4 shot a dead deer. One of them believes it to be a tale of what fathers do for their sons, and another believes his daddy stole his first deer.

Connor (below) travels far in his pursuit of waterfowl. Bob Winstead (bottom right) often regales Gary Sigmon (second from left) with stories of the hunt.

Longing for the land

C-4 will get his degree in risk management and insurance and sit at a desk at the family business because he has a sense of his privilege, that his was a childhood without worries about final notices from Duke Power or if the mill would lay off his momma or daddy, and he is grateful for it. He will take his place in a line of good businessmen, smart businessmen, because he can, because it is what is expected, because he is thankful for the blind luck of his birth. But it's not what he wants. Charles Connor the Fourth wants to farm. He wants to walk the red clay of Catawba County and look to the sky for rain or sun. He wants to stand just below the pines and hear quail call, quail he has nurtured with sorghum crops and cover until his 100 acres

(Left to right) Jason Carpenter, Ted Sigmon, Josh Sigmon, Stan Sigmon and Jeff Bolick are frequent companions afield. Ted, known for his skills in the woods, says the camo look is unnecessary.

are full enough to provide for his supper. C-4 wants to spend his days free from the chain of a computer screen and an oxford-cloth shirt and ride in his pickup truck with the window down, the wind blowing back the sleeve of his Wing Shooters T-shirt, to the kennel to see if Labrador puppies were born in the night before he comes to the Café for breakfast and to talk to the other farmers, the men who are free.

Glen Overcash will be at the Back Table with the others who have earned the privilege of sitting at Claremont's prime spot for harmless lies. Glen has always reminded me of a '50s movie star, the handsome loner who tips his hat and is gone, leaving heartbroken women standing in the dust. I half expect to see him ride in on a pretty paint horse and place six-shooters on either side of his liver-mush-and-egg plate. Sometimes he is gone for a good bit, hunting in Halifax County, where he'd just as soon cook for his buddies as hunt. Glen Overcash can fix the grill at the Café, making him the most important man in Claremont. He and I nearly died laughing the day a belly dancer came sashaying in for the 75th birthday of Sam Willis. There's a picture of it—Sam, his wife and daughters, and a half-nekkid belly dancer—stuck to the wall with black electrical tape. That was a good day.

Mike Benfield will be there, too, at that Back Table. Nobody's man enough to take his chair. Benfield fills up a room, seems bigger than he is, and he's plenty big enough. He knows the river, every bend, every branch of the Catawba, grew up there with a history deep in Catfish—the fire district, not the bottom feeder. He is a deer hunter and a hard worker and a fine friend who will not sell me his 1950 Chevy truck no matter how many real tears I manage to work up. He claims he learned to drive it before he was big enough to reach the pedals but that's a lie. There never was such a time.

Jim Bryant warrants a place at the Back Table, but sometimes chooses the counter. He has an encyclopedic knowledge of Catawba County history and a talent for explaining to tree huggers that they are late to the party, that farmers and hunters were the first environmentalists. As his children grew, Jim

So nervous he believed the deer could see his breath, he decided to hold it until the deer was down, only it was C-4 who was down when he passed out due to lack of oxygen and fell to the floor of the stand.

Bob Winstead (right) and son Robbie hunt North Carolina and Virginia for turkeys and whitetails and frequently share their game with friends in Claremont.

purchased four identical Ruger rifles to match his own longtime favorite, proof that he knows what does and does not matter. The first one was for a son turning 12; the second to replace the first after Jim left it on the cab of his truck and drove away; the third was the reward he offered for the first, which he kept seven years for the next boy in line; and the fourth when his only daughter graduated from college.

I heard Jim talking one day about mounts, the why of stuffing things killed in the woods and sticking them on a nail pounded in the dining room wall. Jim Bryant painted a prettier picture than writers who have been trying to capture it for decades.

He was talking to the younger hunters and said that he doesn't tote a deer head to a taxidermist to feed his own ego but rather to recall the battle, the grace and fight in the buck, the worthiness of his opponent. "When someone comes into my house for the first time, I point to one and tell his story, remember every sound and smell, and never do I claim it as a victory, his death. I only seem to recall how many times he evaded me." It sounded, for all the world, like poetry.

The Sigmon family takes up a whole table, though usually there are chairs holding up the backsides of several others, not kin, gathered around, laughing like fools. The Sigmon brothers were born over a span of 25 years, the youngest, Stan at 46, losing his father before he turned 16. It was Joe and Ted, one gone, the other now 66, who put a gun in his hand and squared him toward a running rabbit. For overnight hunts they rigged the back of a pickup with plywood and sleeping bags so they could double the room, sleep six to a truck. The guy on the top level, closest to the tailgate, would have to open the door of the camper shell in the mornings and lift on the handle so the guy on the lower bunk could ease down the gate, but that's not the only example of their resourceful nature.

Washtub adventure

One member of their hunting party had taken a shotgun along on a deer hunt in case there were no deer but plenty of waterfowl. He saw a pair of wood ducks over the flooded timber of the Roanoke River and dropped them both. The problem with dropping ducks on a deer hunt is the sorry lack of retrieving dogs or proper waders, and so an abandoned washtub became a makeshift boat. He was a slight man, less than 130 pounds, but turns out washtubs aren't as much for keeping a man dry as they are for keeping his beer cold, and midway between land and ducks, he started to sink. More compassionate friends would show sympathy when telling of a buddy who nearly froze, but the Sigmon boys laugh until tears roll and claim that it's fine because "He didn't die or nothing." No one remembers if he got his ducks.

Stan owns a landscaping company, and without much yard mowing or shrub pruning after November, Stan Sigmon hunts. He knows where the deer hide, where the sweet spot is for ducks along Lyle Creek, and if he was more of a selfish man, he'd keep that information to himself. He has trained his second dog now, a Lab named Drake that circles once before delivering to hand, but there seems little need to fix that, and so they hunt ducks with Stan's son, Josh, and any friend with a license who comes along.

Josh dropped a deer some years ago in Bertie County hunting with his daddy and Jeff Bolick. It was dark by the time they went

CLAREMONT CAFE

back to get the deer, and Stan, several yards ahead, radioed to Jeff and Josh that a bear had beaten them to it. He could see eyes in the glow of his flashlight and realized his tragic mistake: leaving the gun behind. "He's circlin' me, boys. Stay where you are." They would all learn a valuable lesson that day about leaving guns locked in the cab of a truck, and Stan would learn a thing or two about hunting with Jeff Bolick. When the warning came over the radio, Jeff said, "Let's go, Josh. No sense in all of us gettin' eat."

Josh waited on his daddy.

Josh Sigmon is the best young man I know, and I embarrass him as often as possible by telling him so. Some folks are born good. They grow good and the good of them lasts into forever. You can just tell. This past Fourth of July he pulled at me when the DJ fired up a sweet song by the Van Zant boys, the one telling Mr. Young his presence is not required in the South, and I danced with a good-lookin' boy barely legal for the first time in close to 30 years. Josh prefers to duck hunt but is in the corn fields during dove season and in a tree stand when allowed by law. This year, he applied for his first tundra swan permit. I sure hope he gets a bird. I sure do.

His uncle Ted is really more a grandfather to him and tortures the boy in ways only grandfathers are allowed. Ted is a cattle farmer, spends early mornings crunching frost under his feet while he checks on the young ones, the ones due any day, and when he can't or won't go hunting with Stan and Josh, he calls their cell phones to get the count. Stan said, "Even if we haven't hit a thing, I tell him, 'We're stackin' 'em up like cordwood.'" If they go home empty-handed, they claim to have left some for seed.

Ted knows they're lying and gets even by dropping deer on days the younger generations never see one. To Jason Carpenter, a family friend, this is particularly irritating. His daddy didn't teach him to hunt. Don Carpenter would rather be brushing the cockleburs from the tail of a brood mare, so Jason taught himself to use a bow and spends a fair amount of time hunting with the Sigmons. "I bought every piece of equipment they make, the base layer, scent block shirts and pants and jackets, and I even got a pair of them 1,000-gram boots. Ted walks in the woods with blue jeans and that same tan jacket he wears every day and a pair of white-damn tennis shoes and kills a buck." Ted tells Jason that his money's been wasted. "I spit on their backs when they walk under my tree stand. It don't bother them."

It is often the Sigmon Landscaping truck I see parked behind the bank, admirers peering over the side. They tend to bring their deer to the Pool Room before putting them in the freezer. Josh told me once that it is part of their tradition, letting everyone have a look. "Yeah, if it's a good one, one worth showing off, Dad will say, 'Let's ride him around till he rots.'"

Tradition of guns

David Carpenter is likely to pull a chair up to the Sigmon table. David graduated from Bunker Hill High School with a 3.8 GPA, a gold tassel and two awards for top rifleman in the district. He started with a Chipmunk .22 and a squirrel in his own backyard, after which his momma took his picture and stuck it in his baby book with photographs of missing teeth and first haircuts. Most of the birthdays and Christmases of his 20 years have brought a gun, appreciation for firearms being a part of his family. His momma—my best-good girlfriend—and I were shopping one day last summer for cute shoes and silver bracelets. I was trying out a new shade of lipstick when she asked if we had time for a

The Café is the center of town life, whether it's the visit of a belly dancer for Sam Willis' birthday (above) or the showing off of a nice deer in the parking lot across the street.

Paw Gantt believed a man should hunt every day and was ill with Brian when girls and cars took a place among his interests. He needn't have worried. Brian Hefner would hold to the belief that a man belongs in the woods.

COURTESY OF GANTT FAMILY

At age 88, Floyd Gantt managed to manhandle his deer into the trunk of his LTD. Grandson Brian Hefner (left, opposite page) still carries the spent cartridge from that hunt.

quick stop. "I need to run by and pick up my concealed carry permit. Gotta stay legal!"

David was born an old man. He frets and worries over things and will squeeze a nickel till it squeals, but he paid cash for his shiny pickup and his four-wheeler and has earned his reputation as a hard worker. A woman from a local furniture mill, working in the sewing room with his mamaw, saved her husband's guns for 15 years after he died, knowing her children would sell them with no thought to their time on the shoulder of a hunter. Upon David's high school graduation, she laid them before him and told him to take his pick. He chose well, a Browning A-5 with engraving and a smooth walnut stock, the gun of a real bird hunter, and so it hunts again, serves another good man.

David hunts doves and ducks with Josh Sigmon, but he hunts deer with his uncle Brian. Brian's grandfather Floyd Gantt Sr. took him on his first hunt, had him lay out of a day of second grade to hunt over on River Bend Road because by that time the die was cast. When he was 3, Brian's momma had bribed him to stop sucking his thumb with the promise of a BB gun, a promise she made good on. He rushed the mailbox with that BB gun one day when an 8-point buck stood eating the acorns that had fallen around it.

He missed.

Brian hunted rabbits and squirrels on his own but trailed his grandpa and well-bred pointers and setters through pines so high they disappear in blue sky. Paw Gantt believed a man should hunt every day and was ill with Brian when girls and cars took a place among his interests. He needn't have worried. Brian Hefner would hold to the belief that a man belongs in the woods. He would be with David when at age 12 he got his first deer, take him to HG and H Bait Shop to have his picture made and put on the wall, and he would provide for his aging grandfather the same opportunity.

Brian hauled slabs to the woods and built a blind on the ground so an old man wouldn't have to climb, one that would keep the wind from his grandfather, allowing him to stay in the woods all day if that's what he wanted. Inside he placed a sturdy chair with a thick cushion and hung an extra coat on the wall. He kept apples and other snacks close by in case his grandfather took hungry waiting on his trophy buck.

Floyd called Brian at work one day and said to come on home, he needed help with a deer. Brian thought he was to go to the woods, but Floyd Gantt had wrestled the buck into the trunk of his LTD and brought it on to the house. "I got him in, but I can't get him out."

He was 88 years old.

Brian helped him, but not before he took him to HG and H, the same as he had for his nephew, got his picture made and put it on that famous bulletin board. He took his grandfather home and cleaned the deer, put the meat in the freezer and made one more stop before going to bed. Brian Hefner went back to the woods, back to the deer stand and picked up the shell casing, a .30-06, and put it in his pocket. It has been with him every day since then and was in his pocket the day they buried his grandfather, a year ago this January. He was 97.

Life lived with hunters

There may come a day when I can't keep up with the light bill, but I will never go hungry. The men in my life are hunters. They are my family, though I am not blood kin to any one of them. Some say it is the way of a small town, but that's not always so. It is so in Claremont. If there was ever any doubt, it burned away on a gray day last November when my pretty little house with the wrap-around porch and fish-scale shingles sent black smoke into the sky. Some shed their camo and donned the coats of the volunteer fire department to fight back the flames with hoses and axes. When Gary Sigmon got the call, he rushed to my side so fast he didn't hang up the phone before grabbing the truck keys and yelling at his wife to "Come on." We stood on the hill and watched it burn. Gary never spoke a word. In one hand he held the ever-present cigarette, and in the other he held on to me. The toughest man I know cried that day. I won't soon forget that.

In the days after the fire, the men of the Claremont Café shoved paper money in my hand and issued warnings not to trust insurance folk. The young boys carried out what they could and didn't talk much. When there was nothing more to save, they looked at their own boots, shifting from one to the other, soot and ashes temporarily taking from them their youth and laughter. Months later they joked and taunted each other with claims of superior strength as they backed their pickups to a new porch and unloaded furniture, some new, some restored, stopping to listen for gobblers in the woods that now surround me. The old men tell me stories that connect me to the history of the new place in the same way they made me proud to live in the one now gone and try their damnedest to tell me what to do.

They argue over the best way for me to feed deer and turkeys and called me hardheaded when I took to painting my barn with a brush. They volunteered to run off a worthless man and threatened to disown me if I didn't make an effort to hang on to a good one. They are my family, my daddies and granddaddies, my brothers, my own young'uns. They are my heavenly band full of angels, come to keep me close and set me free. They wear the clothes of workingmen who dip snuff and cuss like it's an art, and when it comes their time, St. Peter will know he's lucky to have them and that there will be no dragging me through those pearly gates if they aren't there. Better someone ride me around till I rot.

Things change, the way we listen to music, the shows on television and, for me, the direction I turn on my way to the Claremont Café. But if it's not Ted or Stan Sigmon it will be Josh and someday it will be Josh's own boy showing off when I see the gathering, men looking down into the bed of a pickup truck, and I will know that the season started on Saturday morning, that a deer is dead and is worthy of a viewing. ◆

Shari Smith can be found most mornings at the Back Table of the Claremont Café.

David Carpenter (right) continues the family tradition of the hunt instilled in him by his uncle Brian and grandfather Larry Hefner.

MASLOWSKI WILDLIFE PRODUCTIONS

Stuck on Hollies

WRITTEN BY MARK JOYNER

NORTH CAROLINA'S TWO NATIVE EVERGREEN HOLLIES EACH HAVE THEIR OWN RICH HISTORY OF USES, ESPECIALLY IN COLONIAL TIMES.

My intention was to cut down every holly tree on the property when we built our house, and for one reason only. A huge holly had loomed over the deck of a previous home, making it nearly impossible to venture outside without shoes on. With all due respect, a holly leaf is of devilish design, leathery and stiff, with needlelike spines to maximize penetration of the unwary and unshod.

JEFFREY S. PIPPEN

JEFFREY S. PIPPEN

SCOTT TAYLOR

SCOTT TAYLOR

Top two photos: The leaves and berries of American holly are iconic, and its wood and bark have many uses. Bottom two photos: Yaupon is commonly found in the Coastal Plain, where it can sometimes be found growing beside American holly.

Despite my precautions, a lone holly escaped my attention and for nearly 20 years now has quietly matured at the side of the house. We've observed an easy relationship in which I don't walk barefoot in that part of the yard, and it rises well over two stories high. But like moths to a flame, holly trees apparently seek the company of decks, and our paths have come to cross.

I like to think that as I get older I show a little more restraint in my actions, I hope having learned a few lessons along the way. On the other hand, maybe I just wear shoes more often and am not so easily annoyed. At any rate, the holly tree is a welcome part of the landscape these days, and especially appreciated in winter when its scarlet red berries and green leaves provide a needed splash of color.

Obviously, it's a female tree, since only they bear the colorful berries; the male-to-female ratio of holly trees in the wild is said to be about five to one. The fruit lasts throughout most of the winter and provides a feast for many bird species, particularly cedar waxwings. I once witnessed a mob of waxwings gorge themselves on a tree full of berries, leaving it much stripped of fruit, but with its seeds well packaged and on their way. It looked as if the little birds were fit to fly afterward, a fact I mention only because they sometimes come upon fermented fruit, which leaves the entire flock falling-down drunk.

Holly myth and history

A holly tree growing beside a house was actually considered fortunate in days of old, and they were planted for their ability to protect against lightning strikes. It was a lot easier to dismiss superstition like this before studies indicated that hollies actually do conduct lightning into the ground better than most trees, the spines functioning like miniature lightning rods.

Folklore also held that the holly tree was granted an odd assortment of powers and witchcraft functions. A stick of holly thrown at a wild animal was supposed to make it lie down and leave you alone, and placing holly leaves under your pillow could make your dreams come true. A sprig kept near the door was said to bring luck year-round. There were taboos against cutting down a whole tree, but its branches and leaves could be gathered, as long as they were broken off and not cut. Boughs of holly were brought indoors to celebrate the Yuletide in a tradition that dates back thousands of years.

The custom is credited to long-ago Druids who decorated their homes with evergreens during winter to provide dwellings for the woodland spirits. Early Christians were forbidden by the church to adorn their homes with greenery for fear of association with such pagan beliefs but eventually adopted the practice as part of the celebration of Christmas. Today we cheerfully "deck the halls with boughs of holly" without giving a thought to its mystical history.

The winter season itself was believed to be ruled by the Holly King, who battled his twin brother, the Oak King, for supremacy of the Earth. His powers come to a peak on the shortest day and longest night of the year, which are of course the winter solstice. At this point, the sun makes it lowest pass across the sky, rising barely a third of the way above the horizon at noontime. It marks the official beginning of winter and also sets in motion the sun's return; from that point onward the days begin to lengthen. The significance of the celestial event goes largely unappreciated these days, but in ancient times the occasion was cause for great celebration. This too was readily absorbed into Christmas tradition, falling as it does on or around Dec. 21.

In this country, the holly tree has long had its admirers, not the least of whom was George Washington. The first president planted American holly, known to botanists as *Ilex opaca*, over the grounds of his beloved Mount Vernon more than 200 years ago. His journals outline directions for collecting holly seed by the barrelful and sowing it in rows to create a dense hedge. Today there are 13 remaining trees that Washington himself planted, and seven of these are hollies. Through an undertaking called the Champion Tree Project, all have been cloned from tissue and replanted at various sites around the country. The other trees include a white mulberry, two white ashes, two tulip poplars and a hemlock.

There's a persistent myth that Washington even had a set of dentures carved from the wood of a holly tree. Like all good myths, it has just enough truth involved to make it sound convincing. Our first president did lose his teeth at a relatively early age and at the time of his inauguration had but one tooth remaining. Fitted to it was an amazing set of spring-loaded dentures carved from hippopotamus ivory, with eight human teeth and gold pivots. These dentures were stolen from the Smithsonian in 1976 while on display for the nation's bicentennial and never recovered.

In Washington's day boys made use of a sticky concoction from the bark of the holly to catch birds and other small animals. It was called bird lime, and records of its use date back to early Roman times and numerous Shakespearean lines. According to one recipe, it was made by boiling the tree's inner bark for several hours, allowing it to set up for a week or two, and then pounding it into a thick paste. After this had fermented for several more days, it was mixed over a fire with nut oil or goose fat.

The gluelike paste was smeared on tree limbs or other areas where birds were likely to feed or roost, and it cemented their feet as they landed. The first few birds that were entrapped were left in place to call other birds to the scene, where they were also snared.

Useful and ubiquitous

Ironically, holly wood is so prized for carving that perhaps it helped lessen the desire for an often-poached product: ivory. The pure white wood of the holly was considered ideal for ornamental inlays and for fretwork and tuning pegs on musical instruments. It takes fine detail and a high polish and is said to be denser than many other North American hardwoods. By tradition, holly was used for weather gauges and barometers, as well as for white chess pieces. Ebony was preferred for the black chess pieces but was not always easy to come by. Holly takes black stain so well it's difficult to discern the difference, and it thus became the wood of choice for the black keys on pianos.

Even with its usefulness, holly was never in great commercial demand because most trees are relatively small and the trunks rarely straight. Enormous trees do exist, however, especially in the Deep South, where the slow-growing tree really comes into its own. Trees towering over 100 feet tall are common in the Mississippi River delta land. The national champion tree is determined not just by height but also by the size of the trunk and the tree's spread. That recognition falls to a noble tree in the Congaree Swamp of South Carolina that is only 99 feet tall but has a trunk diameter of 31 inches and a spread of 40 feet.

One of the most interesting holly varieties is found only along the coast, where it's so abundant that streets, beaches and even a fishing pier bear its name. Yaupon holly is much smaller than its inland relatives but holds a secret that made it treasured by both American Indians and early European settlers. It's the only native tree in all of North America known to contain caffeine, and its roasted leaves were brewed into the legendary beverage known as black drink.

Archaeologists have unearthed clues that Southeastern Indian tribes made ritual use of yaupon's stimulatory effects as far back as 1200 B.C., drinking it from ceremonial conch shell cups. Early explorer and naturalist John Lawson noted that the native Indians held the yaupon "in Veneration, above all the Plants they are acquainted withal." Its reputation extended far and wide among the tribes, and it was a particularly valuable trading item, showing up as far inland as Missouri, Illinois and the Great Lakes region.

Early encounters by Europeans led to reports that the drink brought about not only heightened alertness but also projectile vomiting. Lawson graphically described the Indians' "drinking vast Quantities . . . and vomiting it up again, as clear as they drank it. This is a Custom amongst all those that could procure that Plant, in which manner they take it every other Morning, or more oftner." In reality, the purging might have been deliberately induced for purification purposes, because at other times it was enjoyed with no ill effects, at least no more than today's coffee, tea and soft drinks bring about. Nevertheless, it was this bizarre usage that led to yaupon's being given the scientific name *Ilex vomitoria* in the 1700s, a blow from which it's hard to recover.

Yaupon tea was also popular with early settlers, especially residents along the Outer Banks, where it was said to be a favorite of Edward Teach, better known as Blackbeard. Places such as Frisco and Kinnakeet were known for their production of the tea, which was even shipped abroad to England, where it was marketed as Carolina tea. Ironically, yaupon tea was so available it became negatively associated with the lower classes, who couldn't afford tea or coffee. There are accounts of a ball game between Kinnakeet and Hatteras some years ago at which the Hatteras fans relentlessly taunted their opponents with the chant "Kinnakeeters, yaupon eaters!" Nevertheless, there's no doubt that meals of river herring, cornbread and yaupon tea got many families of the region through lean times (see "Fish of Yesterday, Fish of Tomorrow," Oct. 2007).

There may be a few folks here and there who still enjoy a steaming cup of the black drink, perhaps with an occasional plate of fried herring. I've put back a few cups myself and can vouch for the flavor, which is a lot like green tea. Although time has moved on and left the yaupon in its wake, anyone interested need only gather a handful of leaves (the caffeine level is highest in summer) and toast them on a pan in a warm oven. For a rich cup of history, stir a heaping tablespoon of the dried leaves into a cup of hot water and sweeten to taste. Come to think of it, I believe I'll have a cup right now on the deck, if I can get out there without stepping on a holly leaf.

Mark Joyner is the executive vice president of the N.C. Aquarium Society and a regular contributor to Wildlife in North Carolina.

MASLOWSKI WILDLIFE PRODUCTIONS

Walk in a forest, along the shore, up a mountain, or through a meadow and you see the flash of colored feathers. How do birds survive in so many different habitats? Take a closer look at birds' beaks and feet and you'll discover the

Tools of their Trade

written by Buffy Silverman / illustrations and nature activity by Anne M. Runyon

FINCH

When you sit down for a meal, your tools are on the table. You stab with a fork and scoop with a spoon. Chopsticks let you pick up sticky rice, but you need a knife to slice a steak. Birds have built-in tools for catching, holding and pulling apart their food.

WIMBREL

BEST BEAKS

The shape and size of a bird's beak is perfectly adapted to handle the food it eats. A long, narrow beak lets shore birds probe deep in mud to find burrowing worms. A strong, hooked beak helps hawks and owls tear up dinner.

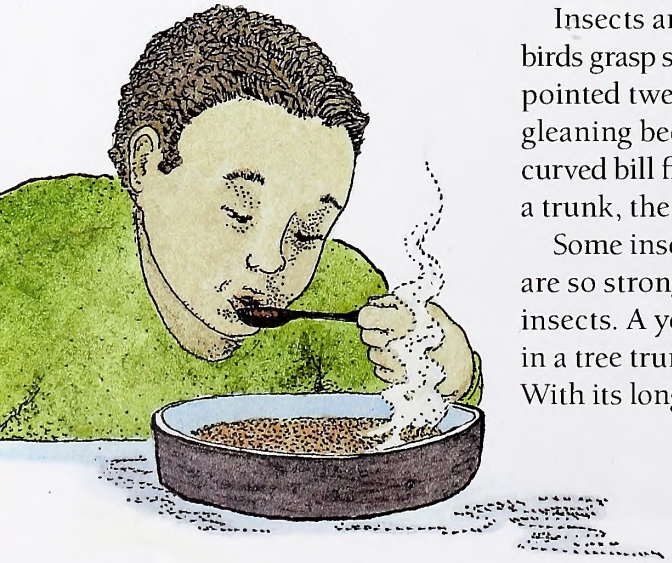
If seeds and nuts are on the menu, birds must crack open tough, outer shells to reach the tasty treat inside. The short, cone-shaped beak of a Northern cardinal is just right for crushing seeds.

In a pond, birds eat plants and animals that they find in water. Many ducks open and close their flat beaks as they dabble at the water's surface. A Northern shoveler swings its long beak from side to side through water, using its beak like a strainer. It traps tiny plants and animals while water dribbles out the sides.

A green heron spears frogs and fish with its long, pointed beak. The heron wades in a marsh at dusk. It stretches its neck forward, takes two slow steps and stands motionless. Lunging forward, it stabs and strikes. It lifts a fish out of water and swallows.

Insects are a favorite food for many woodland birds. How do these birds grasp scurrying insects? Their strong, thin beaks work like sharply pointed tweezers. A common yellowthroat flits through thick brush, gleaning beetles and spiders that creep on leaves. A brown creeper's curved bill fits into nooks and crannies of tree bark. As it spirals up a trunk, the creeper picks off insects.

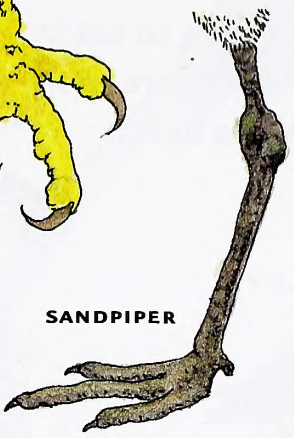
Some insects burrow deep into trees. Woodpeckers' beaks are so strong that they can drill holes in wood and extract insects. A yellow-bellied sapsucker chisels rows of holes in a tree trunk. Sap flows out, and insects come to feast. With its long tongue, a sapsucker laps up sap and bugs.



TANAGER

CARDINAL

HAWK



SANDPIPER

NUTHATCH

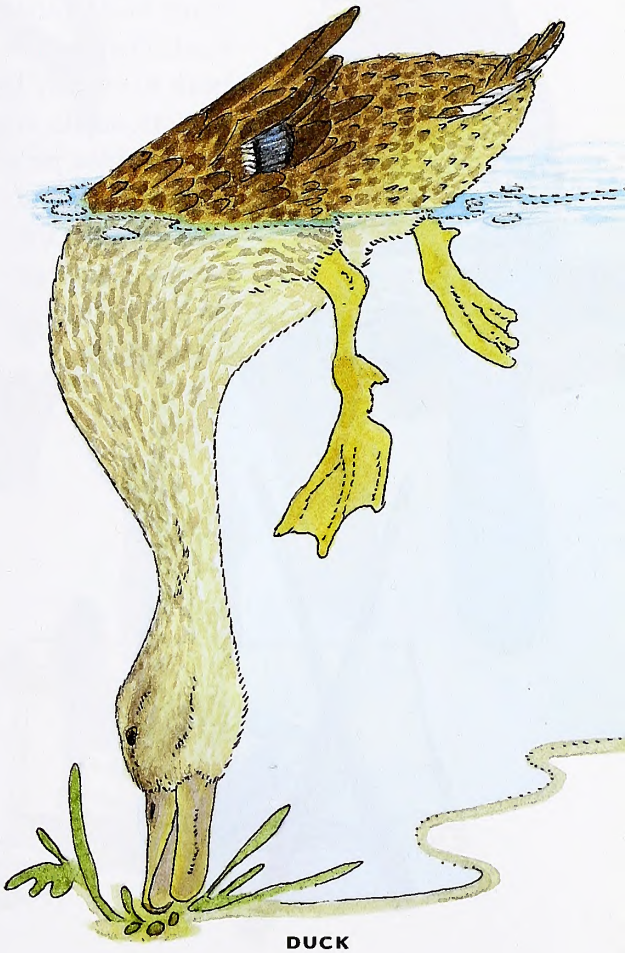
CLIMBERS, GRIPPERS AND PADDLERS

Just like beaks, birds' feet come in many shapes and sizes. Some feet can paddle across a lake. Others grip branches. Feet can be weapons that capture and kill prey. They can work like rakes that scratch the ground for seeds and insects.

Imagine climbing straight up a tree without hands to hold branches. That's what woodpeckers do. With two toes in front and two toes in back, a woodpecker's feet keep it anchored. Strong claws grip tree bark while woodpeckers hammer the trunk for insects.

You might enjoy climbing trees, but you probably wouldn't feel safe enough to sleep on a branch. But a perching bird can. Its toes wrap tightly around branches. Three toes point forward, and a single toe grips from the back. When a perching bird's body rests on its foot its leg tendons tighten, locking the toes around the branch. Many perching birds also use their feet to hold food. While perching on a branch, a Carolina chickadee grips seeds or insects with its feet and pecks at its meal.

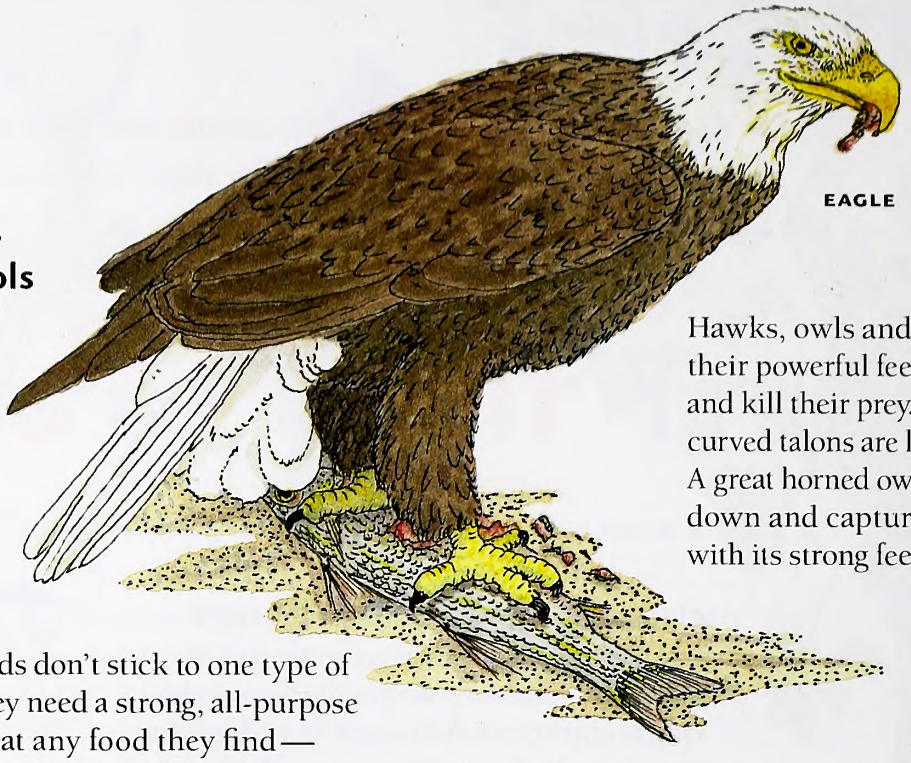
WOODPECKER



DUCK

For swimming across lakes or ponds, many birds rely on webbed feet. The web of skin that connects toes pushes water as a bird paddles. Canada geese can paddle their feet right after hatching. They leave their nest and follow their parents to find food and shelter.

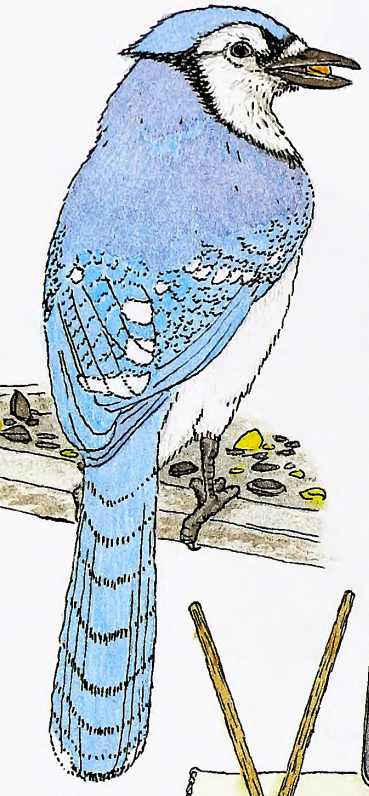
When it's time to eat, beaks and feet are tools that can't be beat!



EAGLE

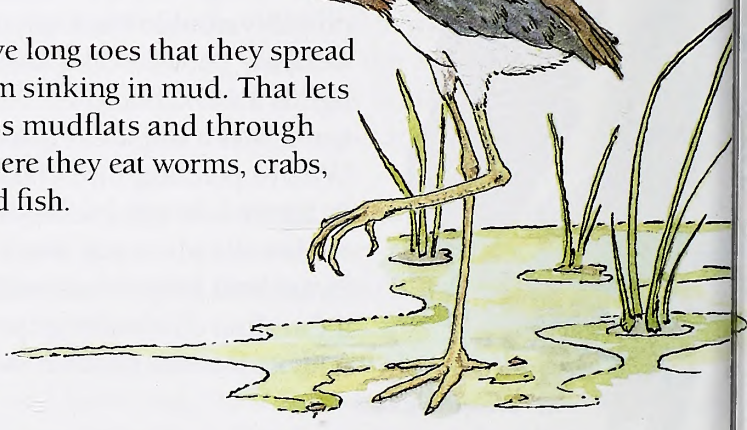
Hawks, owls and eagles use their powerful feet to capture and kill their prey. Their long, curved talons are like daggers. A great horned owl can swoop down and capture a skunk with its strong feet.

BLUE JAY



Many birds don't stick to one type of food. They need a strong, all-purpose beak to eat any food they find—insects, seeds, fruit, fish, eggs and more. A blue jay's beak is like a complete toolbox. It can hammer open an acorn, probe for small insects and worms, seize eggs and nestlings and pick fruits and corn.

HERON



Wading birds have long toes that they spread apart to keep from sinking in mud. That lets them wade across mudflats and through shallow water. There they eat worms, crabs, clams, insects and fish.

Get Outside

Look for birds in your back yard or near your home. Observe one bird closely, using binoculars if you can. Can you predict what it might eat from the shape and size of its beak and feet? Follow the bird's movements and see if you are correct. Record your observations in a journal, with words and sketches.

Read and Find Out

- "Backyard Birds (Peterson Field Guides for Young Naturalists)" by Jonathan Latimer and Karen Stray Nolting, Sandpiper, 1999.
- "Backyard Bird Watching for Kids: How to Attract, Feed, and Provide Homes for Birds " by George H. Harrison, Willow Creek Press, 1997.
- "Beaks!" by Sneed B. Collard, Charlesbridge Publishing, 2002.
- "Bird (DK Eyewitness Books)" by David Burnie, Dorling Kindersley, 2008.
- "Unbeatable Beaks" by Stephen R. Swinburne, Henry Holt and Company, 1999.
- "What Makes a Bird a Bird?" by May Garelick, Mondo Publishing, 1995.

Find out more about Project WILD Workshops and literature at the Wildlife Commission's Web site at www.ncwildlife.org.

Make a Ring-billed Gull Ornament

The ring-billed gull walks and swims well. Each foot has three long webbed front toes and one small hind toe. The slender curved beak is sharp and versatile. It can grab, hold and tear apart small fish, invertebrates, carrion and garbage.

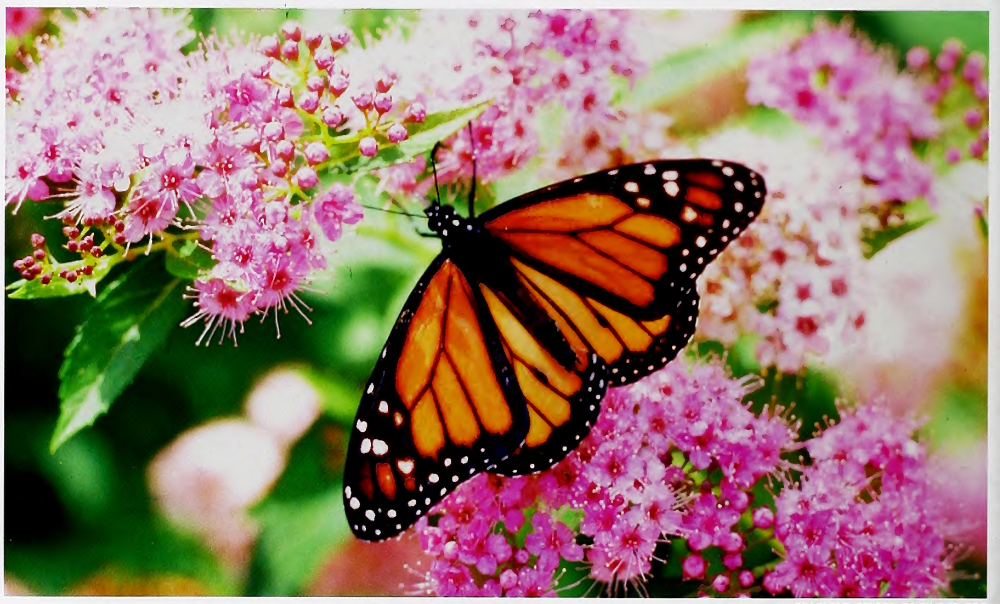
1) If you wish, photocopy this activity on heavy paper.
2) Cut out the two gulls, leaving the colorful edges around each bird.
3) Match and glue them together, back to back.
4) Punch out the hole and thread a string or ribbon through the hole, making a loop.
5) Your gull ornament is ready to dangle.

This activity may be downloaded at www.ncwildlife.org, the magazine page, and copied for educational purposes.

Eastern Female Monarchs in 30-Year Decline

Female monarch butterflies in eastern North America have significantly declined over the past 30 years, reveals a new study by a researcher at the Warnell School of Forestry and Natural Resources at the University of Georgia.

Andy Davis, a Ph.D. candidate in the Warnell School, analyzed published overwintering and migratory data for the insect from 1976 to the present, discovering that the female to male ratio for the butterflies east of the Rockies has gradually been changing. In the late 1970s, Davis said, females made up around 53 percent of the monarch butterfly population that migrated to Mexico for the winter. Today, that number has dropped to about 43 percent, he said, which paints a dire picture for population recruitment. Davis outlines his findings in a new paper coauthored with Eduardo Rendón-Salinas of World Wildlife Fund-Mexico. The paper appears in *Biology Letters*, which is now online at http://rsbl.royalsocietypublishing.org.



CHARLES T. BRYSON/BUGWOOD.ORG

The monarch butterfly, one of the most well-known and widely recognized insects in the world, is a flagship species for conservation. North American monarchs can migrate more than 2,000 miles as they fly to Mexico from Canada and the U.S. for the winter. "The implications of this decline are huge," Davis said. "Female monarchs can lay as many as 400 eggs over their lifetime, which is why the species is so resilient."

DAVID CAPPAERT/BUGWOOD.ORG

But Davis says that as the monarch population continues to struggle because of breeding habitat loss, widespread pesticide use and deforestation of the overwintering sites, losing a significant number of females could seriously hinder the population's ability to rebound after periodic crashes. Davis said that news of the decline has gone unnoticed until now "because no one's ever looked at the data like this. For years, scientists have been collecting male and female monarchs at the overwintering sites and during the fall migration. When we compiled the numbers from these collections, along with the year they were made, the trend was obvious."

At their wintering sites, monarchs cluster on trees and form massive colonies that can number in the millions. Illegal logging of these trees is a serious threat to their wintering stage, but the threats they face in their breeding range in the United States and Canada are just as important. Further, because the decline in females is also present in the fall migration, Davis says, it means that whatever is causing this decrease is happening during the breeding season in the U.S. and Canada.

"This will be the challenge for future studies to sort out," Davis said. "We'll also need to monitor the numbers of females in the population closely over the next few years, at all stages of their life cycle. This discovery just goes to show how new insights can be gained from critical re-examination of published studies, and more generally, how much we still need to learn about this amazing insect before it is too late."

Get Connected with Wildlife

The N.C. Wildlife Resources Commission has developed an electronic newsletter to keep North Carolina hunters, anglers and other outdoor enthusiasts informed of agency-related news.

N.C. Wildlife Update, which is sent to e-mail subscribers on a periodic basis, contains important agency-related information such as upcoming hunting, fishing and trapping season dates, legislative updates, news releases, and hunter education workshops, fishing clinics and other events either hosted and/or sponsored by the Wildlife Resources Commission.

To receive N.C. Wildlife Update and to view past news briefs, visit www.ncwildlife.org/enews.

Spotted Seatrout Size Limit Increased

The minimum size limit for spotted seatrout (speckled trout) in both commercial and recreational fisheries has increased from 12 inches to 14 inches. A 10-fish recreational bag limit will remain in place.

A 2009 stock assessment determined that spotted seatrout is overfished in North Carolina. The increased size limit is needed to allow more female fish to spawn in an effort to restore the stock to a healthy population level.

Only about 89 percent of female spotted seatrout are reproductively mature at 12 inches; by the time they reach 14 inches, 98 percent of female spotted seatrout have reached reproductive maturity.

The N.C. Division of Marine Fisheries is working with an advisory committee to develop a fishery management plan for the species.

CALENDAR OF EVENTS

Friday, December 4

Add to your enjoyment of fishing by attending Fly-Tying for the Beginner at the Pisgah Center for Wildlife Education in Pisgah Forest. Limited to eight participants ages 12 and up. Equipment and materials provided. A $20 registration fee will be refunded upon class attendance.

Visit www.ncwildlife.org.

Saturday–Sunday, December 5–6

Check out the 21st Annual Core Sound Decoy Festival at Harkers Island Elementary School. Activities include carving competition, children's decoy painting, retriever demonstration, decoy auction, head-carving contest and the world loon-calling competition. More than 90 exhibitors will display and sell decoys and waterfowl artifacts. Waterfowl Weekend at the Core Sound Waterfowl Museum runs concurrently with the Decoy Festival.

Visit www.decoyguild.com and www.coresound.com.

Readers should check with the contact listed before traveling to an event. Items for listing should be conservation-oriented and should be submitted at least four months in advance to jim.wilson@ncwildlife.org, or call (919) 707-0177.

Grass Carp Hunting under New Restrictions

Under a new state law enacted by the N.C. General Assembly on July 1, the taking of grass carp by bow and arrow from Lake Gaston and Roanoke Rapids Reservoir is no longer allowed, except under a special permit issued by the N.C. Wildlife Resources Commission.

Existing regulations by the commission had allowed bowhunters to take up to one grass carp per day with a bow and arrow. Many of these fish were examined by commission biologists to determine their ages and growth rates—information needed to calculate fish stocking rates for Lake Gaston. Under permit from the commission, the new state law allows bowhunters to harvest a certain number of fish for these continuing studies.

Grass carp are routinely stocked into Lake Gaston to control hydrilla, an exotic aquatic plant, as part of a cooperative effort between local governments, the N.C. Division of Water Resources, the Lake Gaston Weed Control Council, homeowners and anglers. Approved aquatic herbicides are also used to control hydrilla in the lake.

While hydrilla, along with other varieties of aquatic vegetation, provides habitat for fish and other aquatic organisms, it can cause problems for boaters and swimmers especially in shallow-water sections of reservoirs where it can grow into extensive and dense mats.

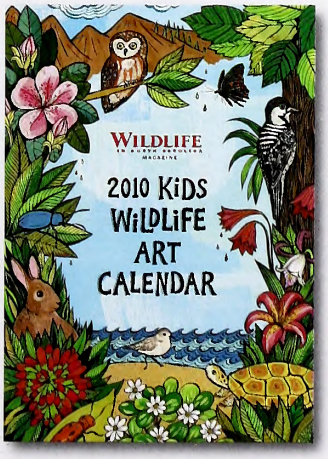
ERIC ENGBRETSON

Kids Wildlife Art Calendar for Sale

Winners of the 2010 Kids Wildlife Art Competition are featured in a beautiful color calendar now on sale. Twelve North Carolina schoolchildren who created original drawings of native wildlife were named winners in the competition, which was sponsored by *Wildlife in North Carolina* magazine and held during the 2008–09 school year. Each child's artwork is featured on a different month of the year.

Students in kindergarten through eighth grade were eligible to enter an original work of a wild fish, bird, mammal, reptile, amphibian or invertebrate native to the state. The magazine held the competition to encourage children to observe and appreciate native wildlife as an inspiration for art and science. There were 2,898 entries.

The winners, age, hometown and art subject are:
Muhammad Ibrahim, 10, Knightdale, brown pelican
Chris Reid, 13, Winston-Salem, Baltimore oriole
Joel Teears, 9, Kill Devil Hills, loggerhead sea turtle
Grace Reaves, 5, Kernersville, Eastern bluebird
Hannah Ramusevic, 8, Raleigh, bald eagle
Rachel Layko, 12, Apex, white-tailed deer among flowers
Asherel Kaseorg, 11, Charlotte, red shiner
Anali Fortunato, 10, Cary, red-bellied woodpecker
Alfre Wimberley, 13, Raleigh, Eastern newt
Emma Dodson, 9, Cary, gray squirrel
Rylen Bass, 6, Charlotte, Eastern cottontail
Zachary Tomlinson, 8, Siler City, Carolina spring salamander

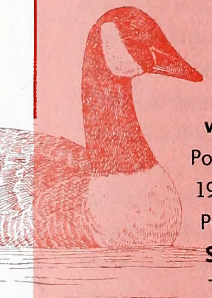


Purchase the 14 x 20-inch spiral-bound calendar for just $7 at www.ncwildstore.com or by calling 1-866-945-3746.

IN SEASON

This month, these seasons are open in North Carolina:

Black Bear: See *2009–2010 North Carolina Inland Fishing, Hunting and Trapping Regulations Digest* for seasons and locations.
Bobcat: Through Feb. 28.
Common Snipe: Through Feb. 27.
Crow: Through Feb. 28.
Fox: See *Regulations Digest* for seasons and locations.
Grouse: Through Feb. 28.
Hatchery-Supported Trout Waters: Through Feb. 28.
Mourning Dove: Dec. 19–Jan. 15.
Pheasant: Through Feb. 1.
Quail: Through Feb. 28.
Rabbit: Through Feb. 28.
Raccoon and Opossum: Through Feb. 28.
Squirrel: Gray and red through Feb. 13; fox through Dec. 31 in selected counties.
White-tailed Deer: Eastern: Gun through Jan. 1. Central: Gun through Jan. 1. Northwestern: Gun through Dec. 19. Western: Gun through Dec. 12.
Wild Boar: Through Feb. 28 only in Cherokee, Clay, Graham, Jackson, Macon and Swain counties. In the other 94 counties of the state, feral hogs are not considered to be wild boars, and the commission does not regulate them.



Migratory Waterfowl

Dark Geese (Canada and white-fronted): Resident Population through Dec. 5 and Dec. 19–Feb. 6. Southern James Bay Population through Dec. 31.
Snow, Blue and Ross' Geese: Through March 10.
Brant: Through Dec. 5 and Dec. 19–Jan. 30.
Tundra Swan: Through Jan. 30 (permit only).
Ducks, Coots and Mergansers: Through Dec. 5 (black and mottled duck closed until Dec. 1) and Dec. 19–Jan. 30.
Sea Ducks: Through Jan. 30 in Special Sea Duck Area.

There is no closed season or bag limit for groundhog, coyote, striped skunk and nutria. There is an open season for taking beaver with firearms or bow and arrow during any other open season for the taking of wild animals.

Check the *Regulations Digest* for bag limits and applicable maps or visit www.ncwildlife.org.

Mountain Lions: Don't Believe What You See

The N.C. Wildlife Resources Commission is warning the public that a photograph of a mountain lion purported to be taken in western North Carolina is actually from Texas. A photo that has been circulating, mainly via e-mail, shows a mountain lion dragging a deer. Some report that the photo was taken in the Marion area, while others say it was taken in Old Fort or Burnsville. In reality, the photo was taken by a trail camera on a ranch in south Texas, where mountain lions are common.

COURTESY OF CHET MARKGRAF

It is one of several mountain lion hoaxes that have circulated through several states, and the e-mails in each state claim that the photograph was taken locally. Over the past several years there have been at least three such mountain lion hoaxes and, in each case, the same photographs are passed around by e-mail and cell phone with text claiming that the photographs were taken locally. In each instance the photos were taken in Western states.

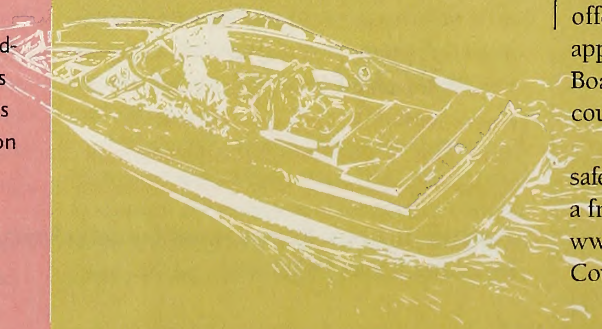
There is no physical evidence to support the existence of a wild mountain lion population in North Carolina. The only mountain lions that have been recovered in the state over the past 50 years were two adults that were shot and killed at a dumpster in eastern North Carolina in the 1980s. Examination of the two animals revealed that they had identification tattoos, indicating that they were illegally held captive animals that either escaped or were released.

Boating Safety Law Takes Effect in May

A new boating safety education law, initiated by the boating community and passed by the General Assembly, will be implemented by the N.C. Wildlife Resources Commission.

Beginning May 1, 2010, vessel operators will be asked by law enforcement officers to present a certification card or proof of compliance with General Statute 75A-16.2.

"The law, with certain exemptions, applies to anyone younger than 26 years old who is operating a vessel powered by a 10 horsepower or greater motor on public waterways," said Capt. Chris Huebner, the state boating safety coordinator. "Violation is an infraction subject to a citation and court appearance."

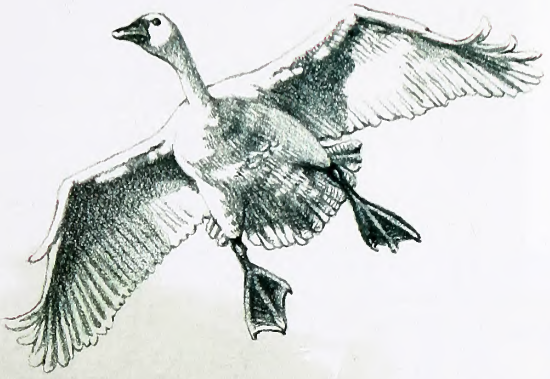


The Wildlife Commission administers free boating safety education courses that, upon successful completion, satisfy the requirements of the new law. The U.S. Coast Guard Auxiliary, U.S. Power Squadron and other organizations, including Internet providers, offer boating safety education courses approved by the National Association of State Boating Law Administrators. Some of these courses can include a fee.

For more information on required boating safety education or to find out how to enroll in a free boating safety education course, visit www.ncwildlife.org/Apps/BoatingSafety/CourseSearch.asp or call (919) 707-0030.

Why Were Tundra Swans Once Called Whistling Swans?

written by Clyde Sorenson
illustrated by Jim Brown



"TUNDRA SWAN" IS A NAME EVOCATIVE of the place these magnificent creatures come from, but they used to be called "whistling swans." The former name referred to the flight call of the bird. The quavering, haunting sounds emitted by the bird can hardly be called "whistles," but compared to bugling calls of their larger cousin the trumpeter swan they could, indeed, be said to whistle.

The calls of both birds are formed by a complex structure called the syrinx, and then modified by the windpipe, or trachea, of the bird. The trachea of the tundra swan is considerably longer than the bird's already long neck, and actually loops back through the bird's sternum (breastbone). This arrangement enables the bird to make louder calls than it otherwise could.

TUNDRA SWAN

trachea

bony hump

TRUMPETER SWAN

syrinx

sternum

The trumpeter swan's trachea is even longer; it not only loops back under the sternum but also passes over a bony lump near the front of the sternum. The trumpeter is a considerably larger bird than the tundra swan, with a proportionately still longer trachea. This extreme instrument gives the trumpeter swan a much deeper voice that can carry for a long distance. There is some evidence that looping through the sternum causes the whole bony structure to vibrate when the bird calls, further deepening and amplifying the sound.

The Magic Cameras

written by Jim Dean

When we say that somebody is always late to the dance, it's not usually a compliment, nor does it have anything to do with happy feet. Typically, it refers to someone who is reluctant to grasp new ideas. There's probably a little bit of that in most of us. After all, we argue, why toss out tried-and-true methods for the latest fad just to be trendy? This line of thinking is especially characteristic of those of us who are no longer whippersnappers (but are old enough to know one when we see one).

JIM DEAN

I have been one of these troglodytes most of my life, and even taken pride in it. I was dragged kicking and screaming into the computer age after wildlife officers took my manual Remington typewriter at gunpoint. My beloved farm cabin still has no electricity—only oil lamps and wood stoves for cooking and heat. I suspect that my first microwave is still under warranty, and the only twittering around my house is from wrens. Some of my friends have suggested that they wouldn't be surprised to find corncobs in my bathroom (not true, the recycling truck won't take them).

"I was dragged kicking and screaming into the computer age after wildlife officers took my manual Remington typewriter at gunpoint."

I may be exaggerating a little, but I am beginning to see the light. After I acquired some rudimentary computer skills, I realized that this was the greatest writing tool ever, especially when linked to the research potential of the Internet. Furthermore, with a laptop and a cell phone, I might conceivably set up shop in a drift boat on the Madison River. Nowadays, I'm far more open to innovation. My old boats have modern depth finders, chart plotters, VHF radios and GPS. I still like vintage stuff, but I'm more inclined nowadays to dip into the past out of sentiment, not necessity. After all, wouldn't Lewis and Clark have explored the American West in Winnebagos if they'd had them?

My latest foray into modern technology involves the dazzling innovations in photography. My first good camera was a Nikon F that I bought in 1963 (I still have it). Over the years, I added more advanced and more expensive cameras, but all of them were rendered suddenly obsolete and virtually worthless by the recent digital photography revolution.

Rather than be dismayed, however, I am delighted with this amazing new technology. No longer are we slaves to the expensive process of buying film and having it processed, or finding room to store the slides or prints. Nor must we worry about outdated film, keep it cool, or protect it from X-rays when flying. My new digital cameras will shoot many hundreds of shots on a single tiny chip, and the settings can be manipulated to shoot in light conditions impossible with film. Digital photos can be viewed and saved or deleted as you shoot them, then downloaded onto a computer where they can be enhanced as desired. To share them with friends or editors, a few clicks will send them via the Internet.

You can even edit a photo to remove unwanted features (an intrusive tree, for example, or a previously significant other who has become insignificant). Nor is sharpness still an issue—some digital images can be enlarged to cover a wall without undue loss of detail.

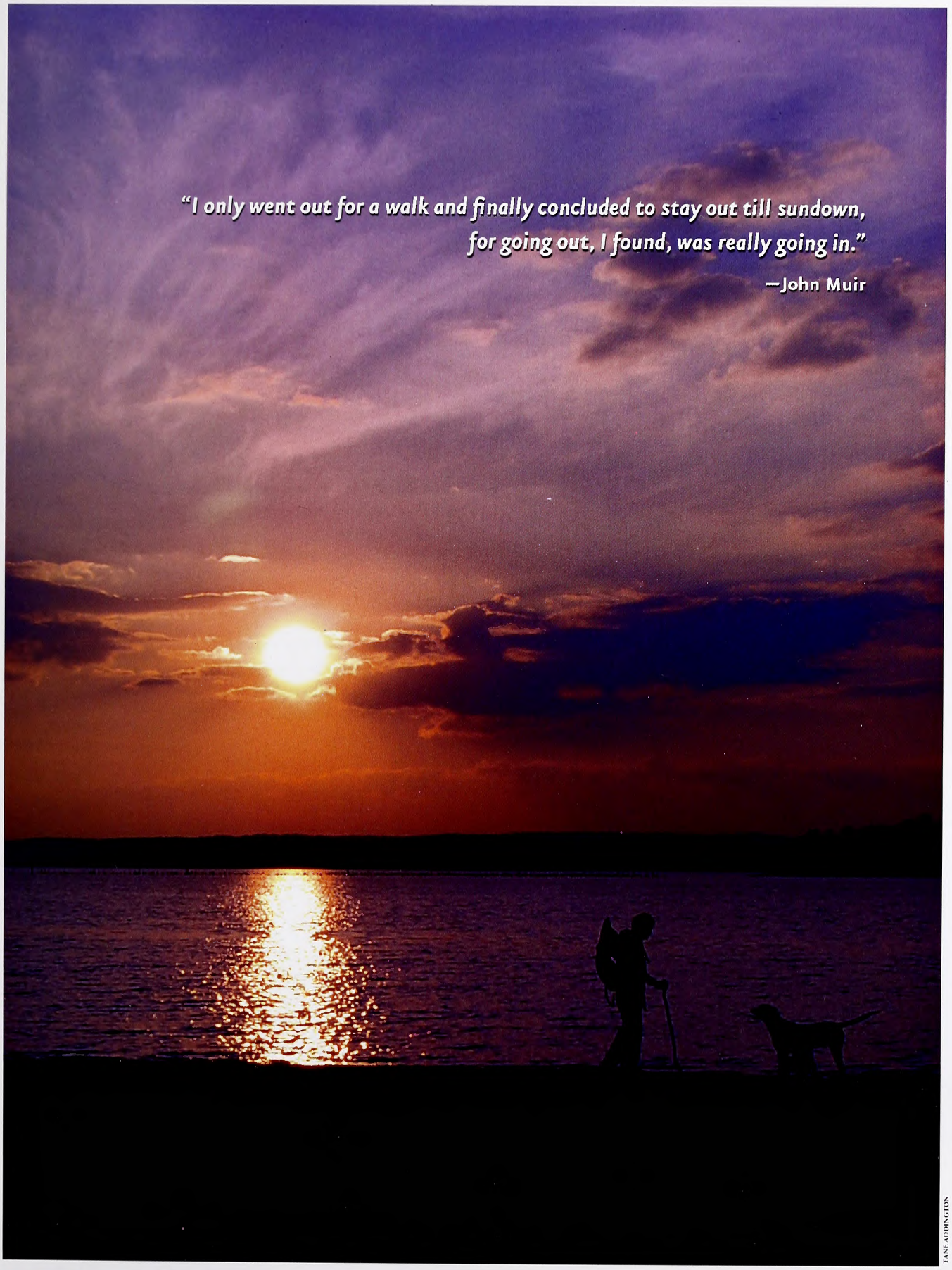
Indeed, given their myriad features and versatility, digital cameras may actually be less expensive in the balance than the film cameras and accessories they replaced. Many are far more compact, too. High quality, dependable digital cameras for professional or amateur use are offered by Nikon, Canon, Sony, Panasonic and many other manufacturers.

My workhouse digital camera is a mid-priced Nikon paired with a zoom lens that can handle most photo opportunities—mine is an 18 mm (wide angle) to 135 mm (short telephoto). A longer telephoto lens is great for wildlife photography, but a lens in the 300 mm to 500 mm range (with built-in motion reduction) may prove more versatile than a truly long telephoto. A macro lens with the added capability to shoot extreme close-ups is another great choice (it's my favorite lens).

I also have a small digital Sony about the size of a cell phone that I can carry in my pocket when fishing or hunting, and it's fully capable of shooting publishable photos. Some compact digital cameras are even waterproof. These smaller cameras are relatively inexpensive and so simple to operate that nearly everyone seems to own one nowadays.

Fast-moving technology has given us many electronic miracles in recent years, and there will surely be more. But if you have been waiting to see whether digital photography is a passing fad, you need wait no longer. The bugs have been worked out, and today's digitals are superb.

Of course, you must anticipate that immediately after you buy one of these marvels, a new model with more bells and whistles will hit the market, possibly at an even better price. No sweat. You can still dance with the partner you brought, and I'm betting this band is going to play a long time.

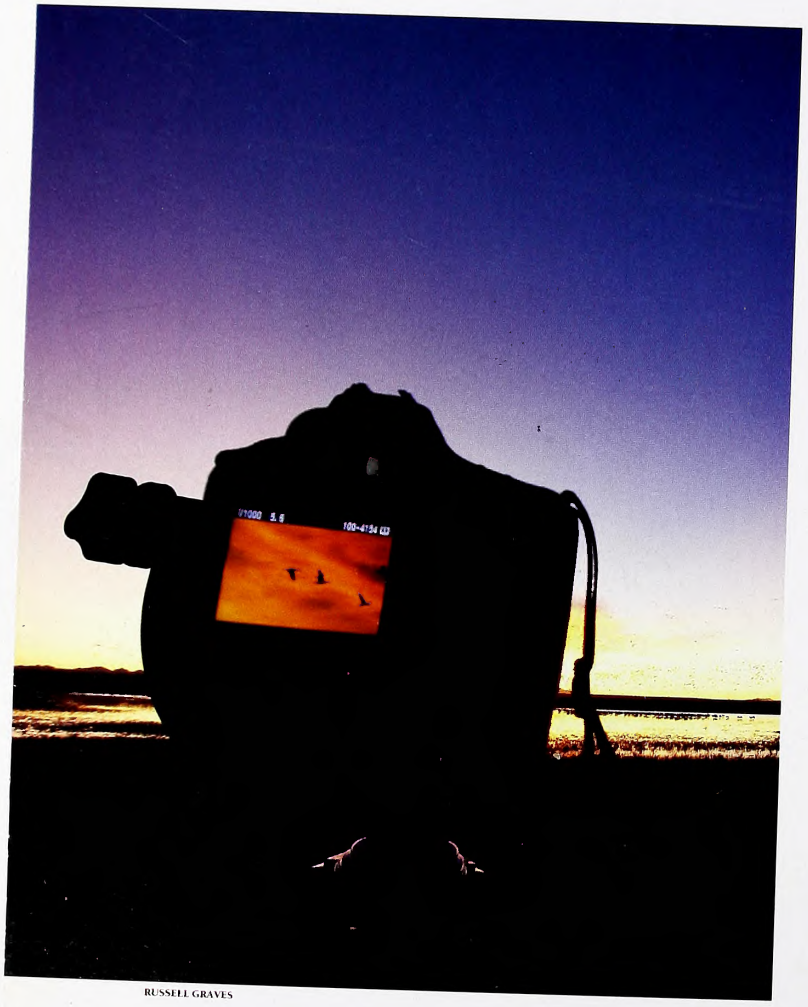


TANE ADDINGTON

OUTDOOR MOMENT

Man, child and dog at Jordan Lake

IN THE JANUARY ISSUE



RUSSELL GRAVES

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PUBLIC HEARINGS

January is the month that hunters and anglers statewide have opportunities to give feedback directly to managers of wildlife resources.

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